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JULY 2018 ● IDG

WWDC 2018

Everything Apple announced

• macOS Mojave • iOS 12 • watchOS 5



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CONTENTS



NEWS

- 4** WWDC 2018: Everything Apple announced
- 15** Our favourite new features in macOS Mojave
- 21** Complete guide to iOS 12
- 32** Phone addiction tackled with new Screen Time app
- 37** ARKit 2 extends Apple's lead in mobile AR
- 41** Why watchOS 5 gives your Apple Watch a boost
- 45** tvOS 12 makes Apple TV 4K the box to beat

FEATURES

- 48** How the iMac changed computing forever
- 55** The iMac's lasting legacy

CONTENTS



83

FEATURES

- Give your old Mac software eternal life **60**
- Requiem for Apple's AirPort Base Station **67**
- Help Desk **73**



55

BUYING GUIDE

- Best budget Mac speakers **83**

ROUND-UP

- Latest Mac games **97**

WWDC 2018: Everything Apple announced

If you missed the WWDC keynote or you don't have time to watch it, [Jason Cross](#) reveals all of Apple's announcements



This year's WWDC was all about software. That meant no new Mac announcements, no low-cost HomePod, no iPhone SE... nothing but iOS, tvOS, watchOS, and macOS. There was still plenty to get excited about, though. Apple's upcoming operating systems are going to deliver a host of improvements and new features when they are released this autumn. Here's everything Apple announced at its keynote presentation.

iOS 12

This is the big one. Apple's most popular devices run iOS, and they are getting a big, fat pile of improvements. Here's a quick list of everything announced, but for a deeper dive, check out our iOS 12 feature on [page 21](#).

Performance: Apple is paying special attention to performance, particularly on older devices. The company says that, on an iPhone 6s Plus, apps launch up to 40 percent faster, and twice as fast when there's lots of heavy multitasking going on. The camera launches 70 percent faster, the keyboard pops up 50 percent quicker, and the share menu is twice as fast, all on an iPhone 6S Plus.

FaceTime: Apple is adding group FaceTime with up to 32 people, the ability to add people in the middle of a FaceTime call, the ability to use Animoji and Memoji in FaceTime calls, stickers in FaceTime calls, and even video filters.

Animoji: There are four new Animoji: T-Rex, Ghost, Koala, and Tiger. Plus, clips have been lengthened to 30 seconds. Animoji (and Memoji) recognize when you stick out your tongue or wink.

Memoji: iOS 12 introduces a new form of Animoji that is made to look like your face (or someone else's, if you want). Think of it as an animated 3D version of Bitmoji. You can customize how your face looks, adjust your hair, and accessorize.



Screen Time: Track how much time you or your children spends glued to their iPhone or iPad. You can set time limits by app type and day, and they even sync between iPhone and iPad. Plus, create exceptions for apps you always want available, such as education apps. For details see [page 32](#).

Notifications: Finally, better iOS notifications. These will be grouped together by app, and you can instantly choose to have notifications for particular apps delivered silently. You can also mark certain alerts as critical so you get them even while in Do Not Disturb mode.

Do Not Disturb: Choose a bedtime, and your display will dim and silence notifications until you unlock your phone the next day. You can also quickly set DND mode to end in an hour, at the end of the meeting you are in, or when you leave your current location. Perfect for school or the cinema.

ARKit 2: With ARKit 2 (see [page 37](#)), Apple extends its leadership in mobile augmented reality. There's improved face tracking, better rendering, a new cross-platform AR file format called USDZ, the ability to save persistent AR states, and the ability for multiple people to share in a single AR experience together. Apple is even including its own app named Measure that lets you quickly measure real-world objects.

Photos: Photos gets a bit of a facelift with a new For You tab, event search, sharing suggestions, and smarter search suggestions. It now supports RAW images, including the ability to edit them on an iPad Pro.

Camera: Portrait mode is improved, the QR code reader is better, and there's an API for developers to separate layers in a photo, so they can do their own portrait modes and other special effects.

Siri: It looks like Siri is getting a host of improvements in iOS 12. The big one is Siri Shortcuts, which lets you perform a set of actions all with a single command. This represents the

first real integration of Workflow into iOS, too. Siri makes intelligent suggestions on the lock screen based on your past history. Plus, it can give you more facts about more things (including nutrition facts), and help you search for a password, too.

Privacy and Security: Safari can do more to prevent websites from tracking you. iOS can help you automatically generate strong passwords for websites and apps, and store them in Keychain. The passwords list will flag reused passwords, too. If you get one-time use passcodes via SMS, they'll be suggested for autofill so you don't have to pop back and forth or memorize them. Third-party password apps get an API to integrate into the keyboard, too.

Overhauled apps: iBooks (now just Books), Stocks, News, and Voice Memos have all been given a redesign and new features.

CarPlay navigation apps: At long last, third-party navigation apps will work in CarPlay. That means you can use Google Maps or Waze in your CarPlay-equipped car.

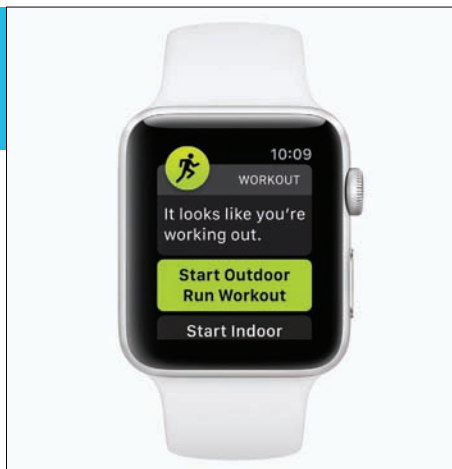
watchOS 5

We don't know what features the next Apple Watch will bring, but the next version of watchOS has plenty of new features. Unfortunately, Apple is cutting off support for the original Apple Watch (series 0), so if you want its new features, you'll need a Series 1, Series 2, or Series 3.

With watchOS 5, you don't have to be so precise about when you start and stop workouts. The watch will remind you

Activity Competitions:

Challenge someone to a seven-day contest where you earn points based on the percentage of your rings you close.



Workout features: Apple Watch will automatically sense you are working out, prompt you to start a workout, and give you credit for the workout you've already done. Then, it will remind you to end a workout. Apple has added new workout types such as Yoga. Great new features for runners include keeping track of pace, rolling miles, and cadence.

Podcasts: Yep, the podcasts app is coming to Apple Watch.

Walkie-Talkie: Probably the most fun new watchOS 5 feature, you can have a one-on-one push-to-talk conversation through your Apple Watch.

Siri watch face: The Siri watch face uses machine learning to get better at surfacing the right content for you at the right time.

No more “Hey Siri”: If you enable ‘raise to speak’, you can just lift your watch to your mouth and tell Siri what to do without saying “Hey Siri” first.

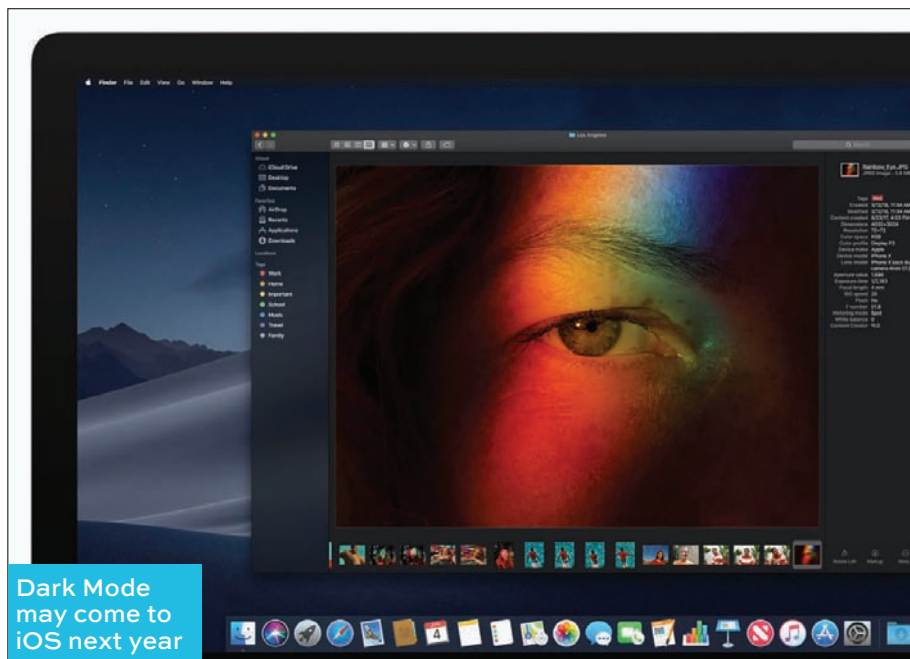
Better notifications: You get grouped notifications like you do on iPhone, better Do Not Disturb options, and more functions that can be done right from the notification itself.

Student ID cards: Some universities will integrate their student ID cards with Apple Wallet and Watch, so you can just tap your wrist to do everything you need your ID card for – building access, buying stuff, whatever. This feature is rolling out with six universities, with more coming over time.

macOS Mojave

Apple made one thing abundantly clear: it is not going to combine iOS and macOS. The next version of Apple’s computer OS, Mojave (10.14), has plenty of new desktop-exclusive features. Apple did confirm that it plans to bring some of the developer UI framework from iOS over to macOS, updated for Mac features such as pointers and hardware keyboards. It’s just an effort to make it easier for developers to make both macOS and iOS apps. Here’s what’s coming in the next macOS.

Dark Mode: It’s a shame this isn’t coming to iOS, but at least macOS is getting a Dark Mode. The Desktop, Finder, and supporting apps can all change their appearance to a more white-text-



on-black-background appearance. Maybe iOS will get this next year?

Dynamic desktop: Special Desktop background images can update based on the time of day.

Stacks: Messy Desktops get icons and files grouped by type, and expand when you click them.

Finder features: The new Gallery view looks like the second coming of CoverFlow. It's a fast way to locate files by what they look like. Quick Actions let you perform common tasks (such as rotating

an image) without opening an app, and you can see all of a file's metadata in the preview pane, without opening the Get Info window.

Quick Look: Mac users are used to checking out a file with the press of a space bar, but you can't do anything with it. With macOS Mojave, Quick Look lets you perform common actions like rotate images, mark up PDFs, trim video, or share files.

Screenshots: The screenshots function of macOS takes a cue from iOS, putting recent screenshots into a little floating thumbnail. Leave it there to save it, or click it to edit, markup, or share.

FaceTime: If iOS is getting FaceTime group calls, so is macOS.

New Apps: News, Stocks, Home, and Voice Memos are all finally coming to the Mac.

Mac App Store: Also taking a page out of iOS's playbook is the Mac App Store. It gets a new iOS-like design, including all the neat editorial content that the App Store added in iOS 11.

Privacy and Security: The same privacy and security enhancements introduced in iOS 12 are coming to macOS. That means helping prevent websites from tracking you if you don't want them to, generating strong passwords, and more password features in Safari.



Siri: Siri gets many of the same enhancements as it does on iOS, but with the addition of the Home app, Siri on the Mac can finally control your HomeKit devices.

tvOS

The customized operating system made for Apple's TV platform may not be getting the big-ticket features of iOS or macOS, but it's got a few new tricks up its sleeve.

Dolby Atmos: The final missing piece of the Apple TV 4K puzzle is support for Dolby's 3D object-based sound format. It's finally coming, along with lots of Atmos-enabled content in iTunes. Your

existing content will be upgraded to Atmos, where applicable, at no charge.

Zero Sign-on: To make signing in less of a chore, the Apple TV will detect your broadband network and sign you in automatically to any apps that come as part of your subscription package. You'll also be able to securely AutoFill passwords using an iPhone and iPad.

Aerials: You can tap on the remote to see the location of an Aerial screen saver, and new Earth Aerials show you spectacular views of our planet as seen from the International Space Station.

Our favourite new features in macOS Mojave

Dark Mode, Desktop Stacks, and iOS apps on Mac are just a few of the highlights. [Leif Johnson](#) reports



It's called macOS Mojave, and the next version of our favourite desktop OS was introduced by Apple software chief Craig Federighi at the WWDC keynote. While there was nothing earthshaking about the presentation, the new features we saw could improve the experience. And yes, it looks like iOS apps will eventually come

to Mac, although maybe not in the way you were expecting. Here are our favourite bits.

Dark Mode

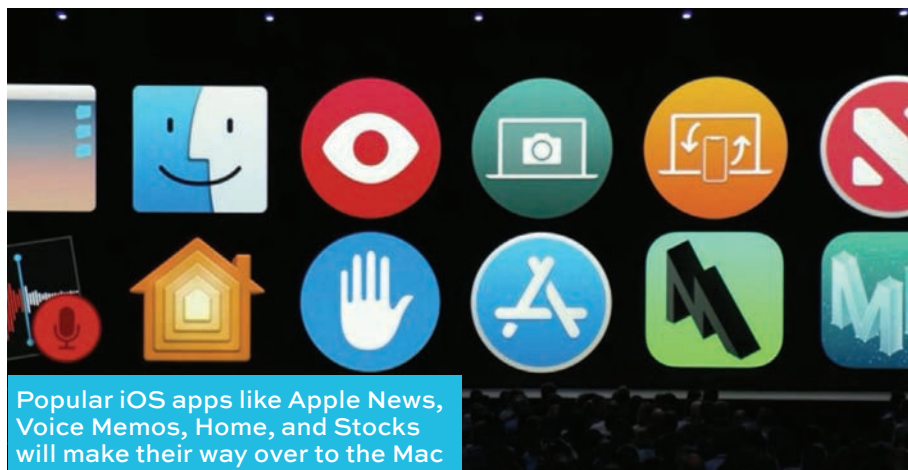
Dark Mode doesn't change the way your operating system works, but it does change typically white macOS screen elements like the Dock, Taskbar, and windows to something that's more akin to Apple's beloved space grey for hardware. It even works with Xcode. Considering that space grey peripherals are now available for Macs apart from the iMac Pro, it's a perfect time to introduce it. It simply looks good, and appearances are always important for Apple.

Desktop Stacks

I've never been one of those people who can work with a messy Desktop, and I sometimes waste a good amount of work time deleting and organizing my files. With Mojave, that will be less of a problem. Apple is introducing a new Desktop Stacks feature that automatically collects specific file types (such as PDFs) into a single pile. When you want to sift through the pile, just click on the stack and it'll expand to show the files you need, while other file types remain conveniently (and unobtrusively) in their stacks.

iOS apps on Mac

Federighi shut down any rumours that iOS and Mac would merge today with a definitive, stage-high 'No', in stark white letters. But there will be some compromises. In one of the simplest, popular iOS



apps such as Apple News, Voice Memos, Home, and Stocks will make their way over to the Mac.

And the iOS/Mac crossover isn't merely limited to Apple's own stuff. Apple is taking UIKit from iOS and implementing it into the macOS framework, allowing third-party developers to more easily be able to port apps from iOS to the Mac. According to Apple, it's a simple process and will be ready in 2019.

Improved security

Privacy, as you no doubt know, has kind of become Apple's Big Thing. In macOS Mojave, Apple will use pop-ups more frequently to tell you if an app is trying to access information such as your location, photos, or microphones, much as we already see on iOS. This commitment to privacy extends to Safari, which will keep

Facebook and similar social networks from tracking you throughout the Internet. Perhaps most impressively, Apple is actively working to make one Mac seem virtually indistinguishable from the other in order to thwart trackers.

Marking up screenshots

This is a big one for me, as I often use the same feature on iOS. In essence, you'll be able to write or draw on a photo or document, which allows you to point out a landmark or a key phrase, for example, before sending it off to a friend. And just like in iOS, taking a screenshot will automatically give you an option to mark it up. It'll go a long way toward making the screenshot tool more useful (although it's a shame that we won't be able to use an Apple Pencil with it). Even better, you can share the marked-up files directly from Quick Look, and you can customize the rules for what happens when you take screenshots.

Improvements to Finder

Finder's blazing speed is one of the greatest things about using a Mac, and in macOS Mojave, it's going to get significantly more useful. With Mojave, we'll have access to a new 'gallery' view, which keeps most of the files in thumbnail mode but keeps the main image selected in a size that fills the screen in all its glory. Improved metadata gives a massive amount of information about the file you have singled out while scrolling through each file. Federighi specifically used an image

file to illustrate the feature – which revealed information about a file’s dimension, exposure time, ISO, and other factors – and that seems like one of the best uses for it.

Continuity Camera

Apple introduced a feature called Continuity Camera, which allows for such handy features as scanning a document on your iPhone and then having it appear on your Mac. Otherwise, you can take a photo from your phone and have it appear immediately in a Pages document.

This is something I’ll end up using often. Currently, similar actions often involve a messy process of emailing the photo to the Mac, or (with iCloud enabled) finding it in Photos after

When you take a photo on an iPhone it will automatically appear on your Mac



it syncs. Especially with research, this could save a lot of time.

Dynamic Desktops

Much like the related Dark Mode, Dynamic Desktops is mainly a cosmetic update, but it's a cool one. In essence, a photo of a scene will change from showing the setting at daytime to night-time in sync with the real-world day and night. At the moment, we're not sure whether you're stuck using Apple's own wallpapers for this, but that seems likely, given the state of similar dynamic wallpapers on the iPhone.

Redesigned App Store

Apple has been hard at work making all of its service interfaces look essentially like Apple Music on iOS, and... well, I'm not so sure how I feel about that. But on the bright side, the upcoming design refresh of the macOS App Store certainly looks attractive, and it's filled with the kinds of huge banners we've become familiar with on the App Store on iOS. Even better, it's got now got handy general topic headings for apps associated with creating, working, playing, and developing. Is it oversimplification? I'm thinking it may be, but I'm excited to try it out so I can find out.

Complete guide to iOS 12

Apple promises faster performance for older phones, plus improvements in Siri, FaceTime and more, writes [Susie Ochs](#)



Apple both sets trends and chases them, and iOS 12, unveiled at the WWDC keynote, is no exception. With this release, the firm is focusing on performance improvements and enhancements, even for older devices. The company is also making important changes to augmented reality that will enable new experiences; improving Siri, FaceTime, and the Photos app to catch up to the competition; and adding new features such as personalized Memoji and weekly

reports about how you're using your device. iOS 12 will be a free update for all users this autumn, and it's supported by every device that runs iOS 11, all the way back to the iPhone 5s released in 2013. Here's a rundown of the operating system's biggest improvements.

Augmented reality and the Measure app

Apple has created a brand-new file format with Pixar called USDZ that will enable easier sharing of the 3D graphics and animations used in augmented reality apps. Developers and users can share these USDZ files like any other files: store them in the Files app, and send them in Messages and Mail. When you receive a USDZ file, you can open it and place the 3D object in the real world. "It's sort of like AR Quick Look," explained Craig Federighi.

For example, if a publisher places a USDZ image into an article in the News app, readers can tap it to open it in a fully interactive AR view, right inside News. Another example shown was Fender using a USDZ object on its website, where potential buyers can tap it to view the product from all angles, shown in an augmented reality view in the room they're in, in actual size.

Users can also try the all-new Measure app to measure the dimensions of physical objects using AR. You just trace the sides of an object to find out how long they are. It can also detect rectangles automatically and tell you the dimensions.

For developers, ARKit 2.0 will enable improved face tracking, more realistic rendering, as well

as shared experiences, which means AR games can now support multiplayer modes. Both players can see the same objects on their own devices, and those objects can have persistence, so they reappear in the same place the next time you use the same app.

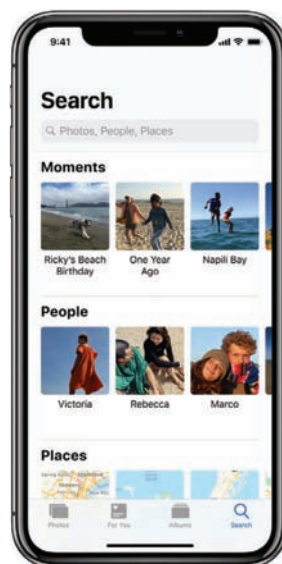
Improvements to the Photos app

Apple's Photos app gets a refresh in iOS 12, matching the design language of Apple Music and the App Store. Search in Photos will be improved, letting you use multiple search terms and search your photo library quicker using Siri.

The Photos app has a new For You tab, which is a feed that shows featured photos, like images you took on the same day in previous years. It suggests loops and bounce effects for Live Photos that could use them, or portrait effects to add to Portrait Mode photos. It also highlights shared iCloud album activity. All these features are in the Google Photos app already, so they are welcome additions to iOS 12, but nothing that has us shocked.

Photos already recognizes other people in your images, and in iOS 12,

The Photos app looks a lot more like Apple Music, with proactive suggestions in the For You tab



it will suggest you share those photos with those people. Images you share arrive in full resolution. When your friend gets them, her phone will suggest sharing photos taken at the same event right back to you, which will help you gather more photos from the same party without having to set up a shared album, or email or text images back and forth. The sharing is private with end-to-end encryption, and all the machine learning to determine who's in your photos is done on your device, not in the cloud.

Siri improvements

When Apple bought Workflow in 2017, we were hoping iOS would eventually get the kind of robust automations it enabled. And now it's time: iOS 12 features big improvements for Siri that can speed up tasks in a single app, as well as let you build routines that use multiple apps, launched with a single Siri command. Siri's third-party app support has been limited so far, so this should be huge for iOS users.

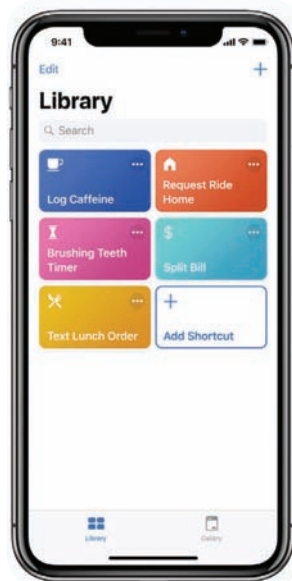
With Siri Shortcuts, any app can expose quick actions to Siri. Federighi gave the example of the Tile app, which you have to launch when you want to locate your Tile tracker. Now the Tile app can suggest a Siri Shortcut to locate your tracker, and you can set a custom Siri command, like "I lost my keys". Now when you tell Siri that phrase, a card launches with that screen in Tile, and you can see where the tracker is, and interact with the card, without even having to open the full app unless you want to. Other examples offered were an "order

The Shortcuts app lets you create your own multi-app workflows that you can run with a custom Siri command

my groceries” command to place an order in an app like Instacart, or “help me relax” to launch your favourite meditation app.

Siri Suggestions are also improved in iOS 12 to anticipate your next actions based on your history. The suggestions can appear on your lock screen and notifications screen, and you can tap one to take care of that action without having to launch an app. It can suggest you call relatives on their birthdays. If you’re late to a meeting, it can send a text to the organizer to let them know, or call into the meeting if a call-in number was provided in the invite. If you order a coffee with the same app every morning, a Siri Suggestion will pop up that you can tap to jump right there.

The new Shortcuts app also lets you combine actions from multiple apps into one routine, which you then trigger with a Siri command. For example, if you say, “I’m going surfing”, the routine can check the surf report with the Surflin app, read you the current weather, grab an ETA for your drive to the beach, and then make a note in Reminders to tell you to put on sun cream when you get there.



The Shortcuts app has a gallery full of pre-made shortcuts, as well as a library you can search. Routines can combine services such as texting, mapping, HomeKit, music, you name it. You can search for items to add, or the app can suggest them to you based on machine learning. In the on-stage demonstration of setting up a ‘heading home’ routine for an evening commute, the app suggested launching the KQED app to play some NPR, because that’s what the user usually did at that time of day.

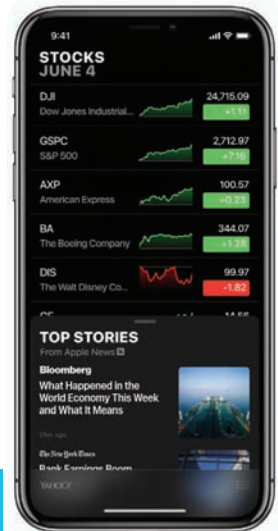
Improvements to News, Stocks, Voice Memos, and Apple Books

A few Apple apps will be redesigned in iOS 12, some launching on the iPad for the first time.

In the News app, the Browse tab will make it easier to discover new channels and topics to follow. The For You tab makes it easier to jump to your favourite sources, especially on the iPad, which gets a handy new sidebar.

The Stocks app has a new design, with spark lines next to each of your picks, showing their performance throughout the day. Stocks also has a news module along the bottom,

The Stocks app has been redesigned



with curated business stories chosen by the Apple News team. When you expand the news module, your stocks run horizontally along the top of the screen like a ticker. You can also tap any stock to see an interactive chart, new after-hours pricing, and relevant headlines curated by the editors. Full articles open without leaving the Stocks app. iOS 12 also brings Stocks to the iPad for the first time.

Voice Memos is also coming to the iPad, with iCloud support to sync your voice recordings between devices.

iBooks has been rechristened Apple Books, with a new design to match the App Store and Apple Music. A Reading Now section shows a preview of your book right at the page you left off, tempting you to jump right back in. The store tabs for ebooks and audiobooks are redesigned, too.

CarPlay improvements

iOS 12 brings new features to CarPlay, Apple's platform for interacting with your iPhone via your car stereo. For the first time, CarPlay will support third-party navigation apps such as Waze and Google Maps. That means you can get turn-by-turn directions from your preferred mapping app, but there was no specific mention of letting users set a third-party mapping app as the default when you ask for directions.

Digital Health features

Apple's improving the Do Not Disturb feature in iOS 12. If you go to check the time at night, for example,

DND Bedtime can just show you the time on a dark lock screen, saving the notifications for later. (Presumably you can still see them if you unlock your phone in a fit of insomnia.) In the morning, it even eases you in, with a lock screen that says good morning and shows the time and temperature, until you tap it again to indicate you're ready for the full deluge of notifications.

Those notifications will be more organized, though. iOS 12 supports grouping of notifications by type, topic, and thread. You can tap a group to expand it, or even swipe a group to dismiss the whole thing at once.

It's much easier to tweak how an app notifies you in iOS 12, too. Until now, you've had to dig into Notifications and then find that app in a huge list of all your apps. It was frankly just easier to delete an app that sent annoying notifications than it was to go in and turn them off or edit their behaviour.

In iOS 12, you can force-press a notification to tweak how that app's notifications work. Siri will even proactively suggest you turn off notifications for apps you're no longer using.

iOS 12's new Screen Time app (see [page 32](#)) will send users weekly reports about how they are using their devices, including how many times you looked at your phone throughout the day, which app pulled you in each time, and even which apps send you the most notifications. You'll be able to see how often you use your apps, and at which times of day. If any of this data concerns you, you can set Time Limits for yourself.

Those limits apply across iPhones and iPads logged in with your iCloud account. Children will get their own activity report, and a separate one is sent to their parents' device. This uses Family Sharing, so parents can manage the reports, Time Limits, and new parental content controls remotely from their own devices.

These are welcome changes, but they could be difficult to implement if, say, your whole family shares an iPad, because iOS 12 still doesn't support individual user accounts, unlike macOS. If I have two children who each love the same app on the same iPad, there's no way to give them each a time limit. Apple may not be in a hurry to fix this, either, because the 'natural' solution is to buy each child their own device.

New Animoji, Memoji, and filters in Messages

The Messages app gets new Animoji characters, including a koala, a tiger, a ghost, and a T-Rex. Memoji are like personalized Animoji. They look more three-dimensional than the custom Bitmoji you make in Snapchat, but much better-looking than the Mii characters you make on a Nintendo console.

Users can customize their Memoji with hundreds of options for skin

You can use Memoji in Messages



colour, hairstyle, facial features, and accessories like hats and glasses. You can save multiple Memoji and use them in Messages to send reactions to your friends. The demo onstage looked pretty good, even though the sunglasses floated on the Memoji face without stems going behind the ears. Hey, sunglasses of the future, right?

The Messages app gets new filters for sending photo and video responses, and you can add stickers, too.

Group FaceTime chats

In iOS 12, you can have a group FaceTime chat with up to 32 total participants simultaneously, over audio or video. FaceTime is even integrated into Messages, so if a group chat is getting unwieldy, you can launch a group FaceTime chat right from Messages, or jump into a group call already in progress.

A side-scrolling roster along the bottom shows everyone in the chat if they don't all fit on the screen at once. Floating tiles for each chat participant get larger when that person speaks. You can also double-tap a tile to see that person front and centre, in case you thought you saw them roll their eyes at you or



You can FaceTime chat with up to 32 people

something. From the FaceTime camera, you can get to your Animoji, sticker packs, and effects. Ever wanted to participate in a meeting of koalas? Now you can. Apple Watch users can answer FaceTime audio calls directly from their wrists, too.

Release date

Apple hasn't yet announced a release date for iOS 12, but it typically launches in September – shortly after the new batch of iPhones is announced, but before the new iPhones ship.

Supported devices

If your device runs iOS 11, it will run iOS 12. Apple even promises better speed and performance on older devices. In other words, Apple says that apps should launch faster on an iPhone 6 with iOS 12 than on an iPhone 6 with iOS 11.

How to get iOS 12

Apple has released beta versions to developers, which they can get from the Apple Developer site. Public betas for regular users follow the developer betas, typically launching in July. If you want to join the beta test, head to beta.apple.com. You can enrol here, and download a special profile that will allow your device to download the beta releases. You'll get a notification when one is ready, or you can check manually by going to Settings > General > Software Update.

Phone addiction tackled with new Screen Time app

Late is better than never, writes [Michael Simon](#)



After vowing to address the growing concern of smartphone addiction earlier this year, Apple is now making good on its word. During the WWDC keynote, Craig Federighi took some time to spotlight some of the new features in iOS 12 designed to help users get a grip on their smartphone habits. Rather than roll out small perfunctory capabilities, Apple is jumping right into the game with a slew of major

changes that put it on par with Google's impressive efforts in Google's Android P.

There are three components of Apple's new digital health initiative: Do Not Disturb, Notifications, and a new app called Screen Time. Working together, they represent a whole new way to get a handle on how you use your iPhone and keep it from bugging you too much.

Do Not Disturb

Apple's Do Not Disturb feature in iOS already lets you keep notifications and alerts from buzzing and pinging you when you're at a meeting or the cinema, but Apple is enhancing its abilities in iOS 12 in several ways. It starts with the end of your day: bedtime. Apple is unveiling a new mode for Do Not Disturb specifically designed for your nightstand, which keeps the screen black until morning. Turn it on and nothing will get through until you wake up.

Apple is also offering greater control over Do Not Disturb, with controls built right into Control Centre. Tap the icon and you'll get new options to set a specific end time for Do Not Disturb, and with location awareness, you'll also be able to tell it to turn off when you leave a specific area, like when you're at the park with your kids or having lunch with a friend.

Notifications

Notifications are probably the biggest annoyance in iOS, and frequency isn't even the biggest problem, organization is. With iOS 12, Apple is changing the

Notifications will finally be grouped in iOS 12

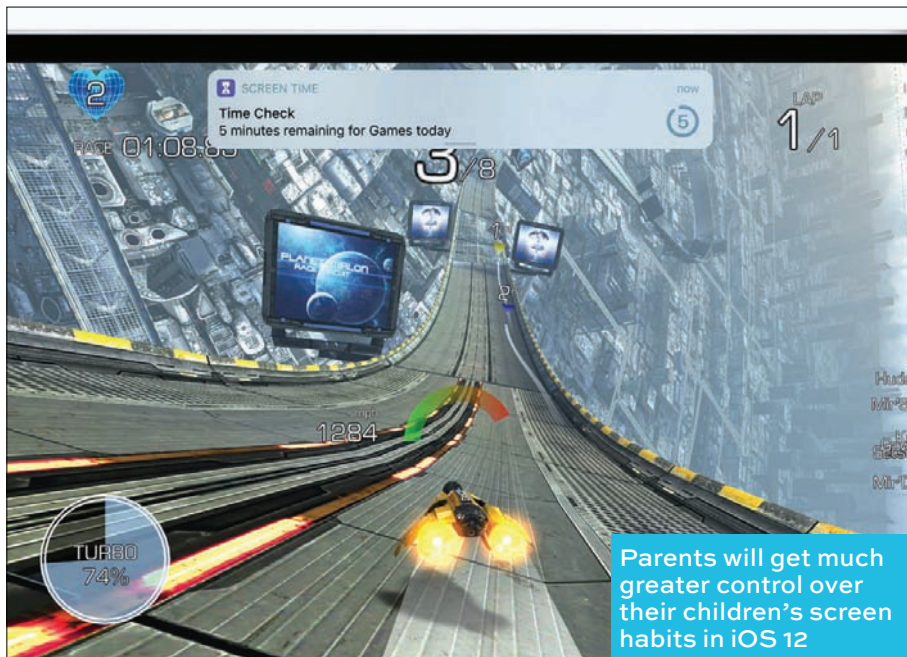
way we receive notifications, and it could have a major impact on the amount of time we need to flick through them.

First and foremost, Apple will be grouping notifications in iOS 12, so you won't need to scroll through dozens of Mail or Twitter notifications every day. Alerts will be grouped by app, topic and thread, and you'll be able to clear or triage all of them with just a swipe. Additionally, Apple will be adding new settings for notifications that let you long-press on an alert to get new actions, such as turning off future notifications from the app or letting you turn on silent mode. And Siri will get in on the game as well, offering suggestions to turn off notifications for apps that you don't use often.



Screen Time

While the enhancement to notifications and Do Not Disturb are nice, the biggest changes to iOS's digital wellness is with Screen Time. Much like Android P's new Dashboard, the app will provide a series of daily reports that let you keep tabs on how much time you're spending in your favourite apps and how many notifications you've received,



Parents will get much greater control over their children's screen habits in iOS 12

so you can try to cut down on your usage. To help in that regard, Apple is also providing a new dial that will let you set limits on how much time you can use an app. When you tell Screen Time how much time you want to spend using Instagram, for example, an alert will let you know when the timer is nearing its end and full-screen messages will block your access when you try to launch an app that has reached its time limit. And since your settings stay synced across all of your devices, you won't be able to cheat by switching from your iPhone to your iPad. (Don't worry, you can override your decisions in the event of an Instagram emergency.)

Children

While limiting our own screen time is important to our mental health, it's loads more important for our children. While Amazon and Google each have apps that let parents set restrictions for how much time young ones can use their devices, Apple failed to implement any kind of parental controls in iOS 11, leading to some pointed criticism of the company.

That's changing in a big way in iOS 12. With the Screen Time app, Apple is offering parents a new interface for controlling what their children can see and how long they can see it. With full remote management, parents will be able to create 'allowances' for children using different devices, setting limits based on usage and time of day. There will also be easier restrictions settings that limit specific apps and categories, or simply cut off certain types of content. Finally, parents will also be able to set apps that can always be used, such as Messages or Phone.

ARKit 2 extends Apple's lead in mobile AR

Jason Cross looks at what's new



Apple is serious about augmented reality. Tim Cook has been clear about how important it is, saying it will “change the way we use technology forever”. With ARKit in iOS 11, Apple brought AR capabilities to hundreds of millions of phones. With iOS 12, it brings developers ARKit 2 with enhanced capabilities like 3D object detection, persistent experiences, and shared AR spaces.

It's a robust improvement on what is arguably the best set of AR tools for mobile devices anywhere.

What's new in ARKit 2

When ARKit debuted with iOS 11 last September it immediately made waves, but the limitations were obvious. With iOS 11.3, the ARKit developer tools got more powerful, adding the ability to track vertical surfaces and non-flat surfaces. Now, just one year later, Apple is updating to ARKit 2. Here's what Apple says is new.

Improved face tracking: Apple didn't dive into this, but the name is self-explanatory.

Realistic rendering: The rendering of augmented reality objects is already quite good. Apple didn't say exactly how rendering has improved, but we expect more accurate lighting is key.

3D object detection: ARKit detects flat rectangle objects like posters or book covers, but ARKit 2 allows developers to detect fully 3D objects. That's going to be huge.

Persistent experiences: You can save AR spaces and objects that are linked to physical objects (such as toys) or physical spaces (like classrooms), so you can pick up where you left off later.

Shared experiences: Multiple users can use their iOS devices to view the same virtual environment, each from their own view. Apple is releasing a block-breaking multiplayer game as a code demo, and Lego showed off a virtual plays pace where up

LEGO showed an impressive demo that used nearly all of ARKit 2's new capabilities: 3D object detection, multiplayer, and persistence



to four players can interact with a combined virtual and real play space all at once.

Measure app

When ARKit launched, it was quickly followed by a flood of measurement apps. Apps to take virtual measurements of lengths, volumes, room sizes, you name it. Apple is getting in on the game with its own measurement app, aptly named Measure.

Measure looks like a simple, reliable version of the many AR measurement apps out there. You can make linear measurements, even of 3D objects

to quickly compute volume. It even recognizes rectangular objects automatically, so you just point at a poster, photo, or rectangular table, tap, and get a full set of measurements. This is one of Apple's simpler apps, like the Calculator, Compass, or the built-in Flashlight. And like those apps, it's an appropriate thing to have built into your phone, but not the sort of groundbreaking experience that will make people switch to iPhone.

USDZ format

Apple worked together with Pixar to develop a new file format for augmented reality objects called USDZ. It's going to be supported by third-party apps, including ones by Autodesk, Adobe, Sketchfab, and more. Adobe CTO Abhay Parasnis took to the stage to say that Creative Cloud will support the format, and that their tools will even allow what-you-see-is-what-you-get editing of VR objects with iOS devices. Does this mean that USDZ will become a widely supported format, even beyond Apple devices? Apple wasn't clear, but it looks like the odds are good that USDZ could become the next HEIC.

Supported devices

According to Apple, "ARKit 2 and USDZ support will be available this fall as part of a free software update for iPhone 6s and later, all iPad Pro models, iPad fifth generation and iPad sixth generation." That's pretty much every device that supported the original ARKit release.

Why watchOS 5 gives your Apple Watch a boost

But the original £8,000 Apple Watch won't be able to get it.

Michael Simon reports



With rumours swirling about the first Apple Watch redesign due to land in the autumn, Apple used its WWDC keynote to focus on some of the new features in watchOS 5. The new features just might keep some of those old models in circulation a little longer – though not the original Watch, which will be dropped from watchOS 5 compatibility.

From workouts to watch faces, version 5 is shaping up to be one of the best upgrades to

watchOS in years, and we can't wait to get our hands... er, wrists on it. Here are five reasons why it'll be a must-upgrade.

1. Fitness features

Apple Watch is already one of the best fitness trackers you can buy, and watchOS 5 is only going to make it better. It starts with the Activity app. Instead of just tracking your own exercise, you'll be able to set up weekly competitions with friends as you battle to earn those precious badges.

Workouts have been enhanced as well. There are new presets for yoga, hiking, and outdoor running, which will track things like your heart rate, elevation, and cadence. Your watch will also be able to automatically detect when a workout has started and let you know if you've forgotten to end it.

2. Walkie-Talkie

While our Apple Watches already offer cool ways to communicate, Apple is adding another one in watchOS 5: Walkie-Talkie. After a one-time request during setup, you'll be able to contact other Apple Watch users just by tapping a Talk button on the screen – without dialling, typing, or doodling. And it'll work over Wi-Fi or LTE, so you'll never be out of range.

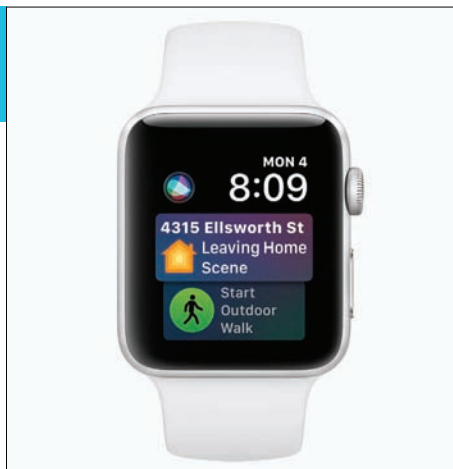
3. Siri watch face

Since its introduction in watchOS 4, Siri has quickly become a favourite watch face, and it's getting a host of improvements in watchOS 5. First off, there

Third-party apps will be able to add their own cards to the Siri watch face in watchOS 5

will be new cards for sports scores, maps, and heart rate, as well as support for the new Siri Shortcuts in iOS 12. But best of all, developers will be able to get in on the fun

with a new API that lets third-party apps appear on the face as well. And finally, there will be no need to say “Hey Siri” anymore. Just raise your wrist and start talking.



4. Interactive notifications

Notifications on Apple Watch are mostly a passive experience outside of Apple’s core apps, but we may be interacting with them a whole lot more in watchOS 5. While phone alerts will still mainly be shortcuts, Apple is letting developers build buttons into notifications in watchOS 5, so we don’t need to bounce to an app just to turn on a workout or check into a flight.

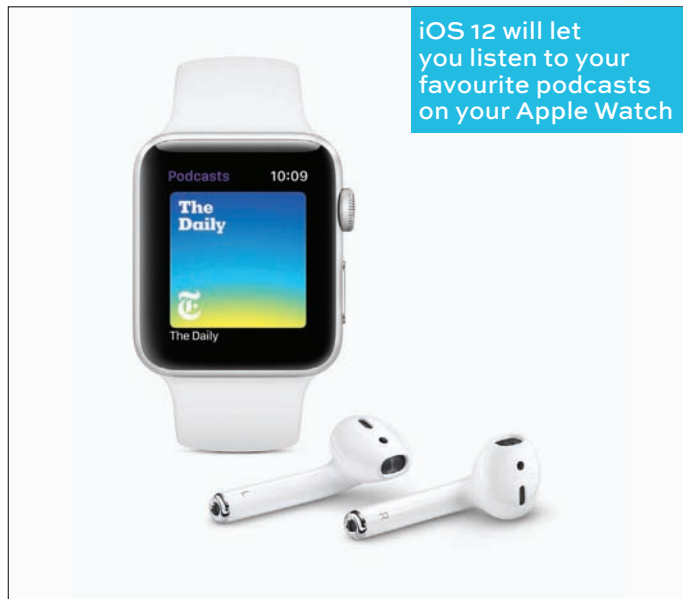
Furthermore, with grouped notifications, you’ll be able to see full conversations without scrolling through unwieldy list of alerts. And when you get a link in Mail or Messages in watchOS

5, you'll actually be able to view it on your tiny screen thanks to Webkit support. Add it all up, and we'll have even fewer reasons to pull our phones out of our pockets.

5. Podcasts and background audio

Apple is finally bringing the Podcasts app to the watch. That means you'll be able to listen to your favourite podcasts on your watch, with synced playback across all of your devices so you'll be able to pick up right where you left off.

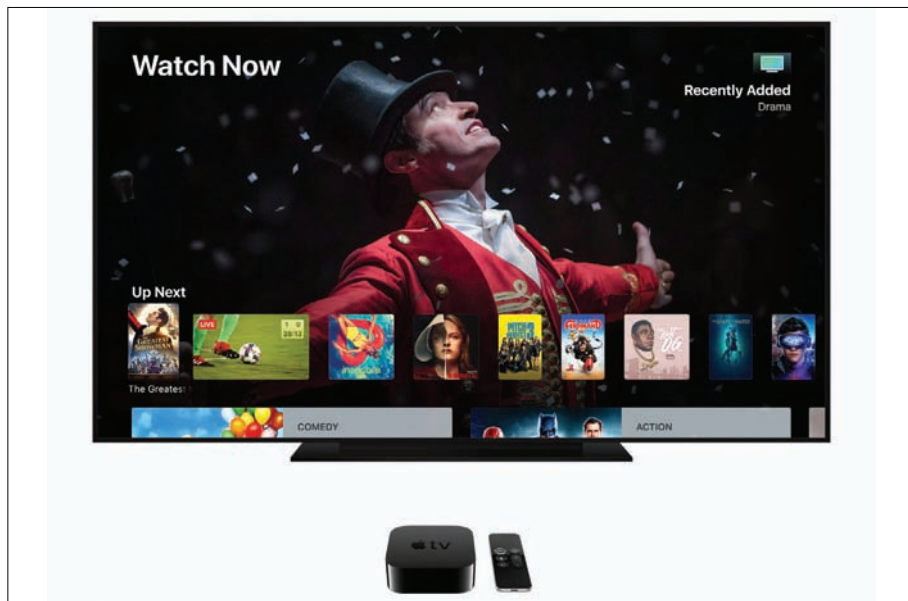
And one more thing for music lovers: third-party apps will now be able to keep their audio playing in the background, which opens up the possibility of a Spotify app.



iOS 12 will let you listen to your favourite podcasts on your Apple Watch

tvOS 12 makes Apple TV 4K the box to beat

Dolby Atmos support makes it one of the best streaming boxes around, writes [Jason Cross](#)



With tvOS 12, the Apple TV 4K finally gets the improvements necessary to be the best streaming box on the market.

Announced at Apple's WWDC keynote, Dolby Atmos support is a highlight, but Zero Sign-on could be the most important advance in making streaming media boxes easier to use.

Dolby Atmos

Apple TV 4K launched last year with a handful of issues, HDR and frame rate switching hiccups chief among them. Further iOS releases smoothed all of those out, but one oft-requested feature was still missing: Dolby Atmos audio support.

With tvOS 12, Dolby Atmos comes to the Apple TV 4K. All you need for full 3D immersive audio is an Atmos-supporting sound bar or receiver. This makes Apple TV 4K the only streaming media box to be certified for both Dolby Vision and Dolby Atmos.

Apple says iTunes movies and TV shows will be updated this autumn with the largest selection of Dolby Atmos-enabled content anywhere. Just like the transition to 4K and HDR, all existing content will be upgraded to Atmos at no cost.

Zero Sign-on

One of the best features of tvOS 11 is called Single Sign-on. You add your broadband provider's login information to your Apple TV device. It's a big step forward, but still a little bit of a pain. With tvOS 12, Apple makes the whole process totally seamless with Zero Sign-on. Apple says that it will come later this year.

Aerial improvements

Apple's breathtaking 4K video screen savers, called 'Aerials', is one of those minor delights that Apple TV 4K users can't get enough of. In tvOS 12, they get better. You can tap the remote to see the location at which the Aerial was filmed.



A new set of Aerials is the star of the show, however. Called 'Earth', these are stunning videos from space, taken by astronauts at the International Space Station (ISS).

Reaching out

With tvOS 12, your Apple TV is going to work better with outside ecosystems. The TV app will provide live content from select TV providers, starting with CANAL+ in France and Salt in Switzerland.

But it's not just about making the TV app work with your TV provider. Apple is allowing third-party home control systems' remotes to control your Apple TV (including Siri), so you can finally throw away that terrible Apple TV remote. Apple called out Crestron, Savant, and Control4, but others should follow in the future.

How the iMac changed computing forever

Benj Edwards looks at Apple's most iconic desktop computer



The iMac made an instant impression when Apple first unveiled it in May 1998. But it didn't start to really shake things up until it began to ship – which happened 20 years ago on 15 August, 1998. Arguably the most influential desktop computer of the past two decades, the

original iMac's specifications seem quaint by today's standards. If you were lucky enough to own one, you came home with a 233MHz PowerPC G3 processor, 32MB of RAM, a 4GB hard drive, a 15in built-in monitor, and stereo speakers – all in an amazingly stylish case.

The Bondi Blue wonder heralded the return of Steve Jobs as a visionary leader for Apple, and it halted Apple's mid-1990s financial free fall. Initially marketed as an easy-to-use gateway to the Internet, the iMac transcended that simple role and redefined the desktop PC market – not to mention consumer industrial design – forever.

But have you ever wondered how? Here's how the original iMac shook the world.

It killed beige

Before the iMac, personal computer enclosures were stuck in a design rut. Most manufacturers produced beige or grey metal boxes, each designed as a merely functional piece of equipment instead of an aesthetically pleasing creative tool. The iMac's design shattered the status quo with its preference for gentle curves over harsh corners, and for vibrant colour over dull neutrality. Apple even coined a new term, 'Bondi Blue' – a blue-green hue named after Australia's Bondi Beach shoreline – to describe the colour of its new machine. Combined with an ice-white pinstripe pattern, the colour scheme create a stunning enclosure theretofore unseen in the PC world. It made quite an impact on the public, but that was only the beginning.

It hit us in the ‘i’

iThis, iThat – iPod, iPhone, iChat, iLife, iSight. Where did all those lowercase iPrefixes come from. You can thank the iMac for starting this ubiquitous Apple branding trend.

The ‘i’ in ‘iMac’ originally stood for ‘Internet’ (or alternately: “individual, instruct, inform, or inspire,” according to Steve Jobs’ introductory 1998 iMac slide show). The ‘i’ prefix even trickled out to non-Apple product names – mostly in the form of iPod accessories. After the Internet became ho-hum everyday news, Apple’s iPrefix shifted meaning to serve puns like ‘iSight’, or to ambiguously imply the empowering first-person pronoun ‘I’, as in ‘iChat’.

It launched on the Internet wave

Apple’s first marketing angle with the iMac relied heavily on the expanding popularity of the Internet in the mid-1990s. With the ‘i’ in ‘iMac’ being short for ‘Internet’, Apple billed the iMac as an easy way to get connected to the global network (in just two steps, according to one Apple advertisement). By focusing on the iMac’s Internet aptitude, Apple chose a unique way to differentiate its product from other computers and to leapfrog to the top of the consumer PC heap. It worked.

It introduced USB to the masses

The iMac’s sole reliance on the USB interface meant that Mac users had to throw out all their old mice, keyboards, scanners, printers, and external drives. The computer’s lack of SCSI ports

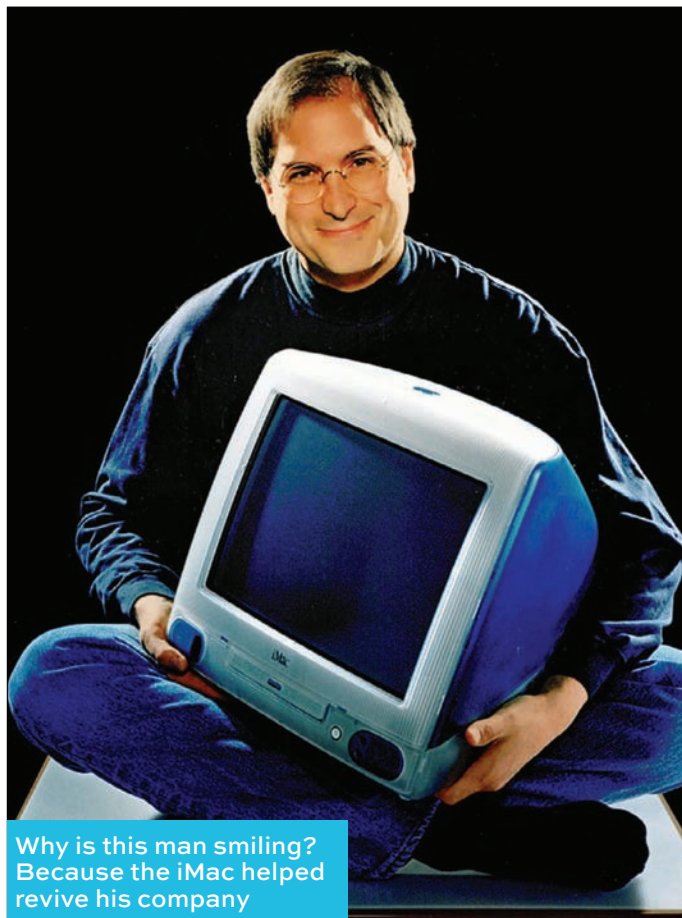
bold statement – Apple was declaring that from now on you will use the Internet and local networks to transfer your files. And Apple was right, even if the company was slightly ahead of the curve.

It set standards for industrial design

The next time you see a consumer thingamabob with a translucent plastic case – especially those available in multiple candy colours – you can thank (or curse) iMac chief designer Jonathan Ive. After the release of iMac, multicoloured translucent plastic housing became such a common staple in the consumer products industry that the iMac's 1999 to 2000 Technicolor parade of models almost became a parody of itself. Apple had to move on, dropping the bright array of colours from the product line with the release of the flat-panel iMac in 2002. Even then, other companies came along for the ride: most consumer electronics devices now ship in brushed aluminium, frosty white, or glossy black – the colours used in other iMac iterations.

It redeemed Steve Jobs

During a power struggle in 1985, Apple executives forced Steve Jobs to resign from the company he co-founded. After Apple purchased NeXT in 1997, Jobs returned to the firm and soon became 'Interim CEO'. The world looked to him to turn the company around, and he delivered: after dumping unprofitable product lines and streamlining the business in general, Apple was back in the black. But no amount of fiddling with the budget could



Why is this man smiling?
Because the iMac helped
revive his company

compare symbolically with the success of the iMac – clearly Jobs’ baby – which served as a concrete reminder of his uncanny ability to inspire those under him to create incredible products. The iMac’s success meant Jobs’ success, and it inspired the Apple faithful to follow him once more.

It saved Apple, too

In 1996 to 1997, the media pronounced Apple all but dead. The company lost \$878 million in 1997, but under the renewed guidance of Steve Jobs, it earned \$414 million in 1998, its first profit in three years. Those results stemmed from both reducing operating costs and from iMac sales. And yet the iMac meant more than just financial returns: the symbolic impact of Apple once again having an exciting, innovative product marked a victory in the hearts and the minds of the public, and it proved that Apple still had the chops to stay in business.

Thanks to continued innovation in the iMac line and beyond, Apple is now more profitable than ever, and will likely continue to be so. But even with the iPhones and iPads dominating today's news, we shouldn't forget that Apple's 21st century success can be traced directly back to iMac's launch a decades ago.

The iMac's lasting legacy

The iMac's influence reaches far beyond the desktop, or even the PC, argues [Dan Moren](#)



Plenty has already been said about the 20th anniversary of the iMac (see [page 48](#)), the computer that played an instrumental role in bringing Apple back from the brink. But the legacy of the Bondi Blue iMac is still with us in many ways today – not just in the computer that shares its name, but in an overriding philosophy that Apple

continues to exemplify across its product line. If you wanted an indication of how Apple would be doing business in 2018, you could do worse than cast back two decades and look at the decisions that it made when it produced that first iMac. (A machine that itself took a page directly out of Apple's own playbook for the original Macintosh back in 1984.) The line is anything but subtle.

All in one, and one in all

The all-in-one design of the iMac was nothing new in and of itself. The original Macintosh had been based on the same principle: a device that was more like an appliance than other personal computers. Apple had produced a number of all-in-one Macs in the intervening years, with varying degrees of success.

The original Macintosh



But what the iMac did signal was how important the all-in-one philosophy was to the future of the company. Fast forward 20 years and not only is the all-in-one iMac now the stalwart of Apple's desktop line, but the rest of the company's products have followed suit. Laptops, the predominant form factor of not only Macs but the entire PC market, are even more all-in-one designs than even an iMac. Indeed, the Mac mini and the defunct Mac Pro, which together make up only a small percentage of Apple's sales, are the only modular computers left in the company's lineup. (Until, that is, the much anticipated new Mac Pro arrives next year.)

But more than that, the all-in-one philosophy eventually brought us to both the iPhone and the iPad: computers that are fully functional without the need for any additional components whatsoever. Sure, you can add a keyboard or some Bluetooth headphones, but even without those, you've got the whole package in the palm of your hand. Everything you need, nothing you don't.

Out with the oldish

When the iMac debuted, it threw away a lot of the cruft of the Macs and PCs that came before it. The only trouble was people were still using a lot of that cruft. Not only did the iMac eschew the dying – but still standard – floppy drive, but it also ditched legacy ports, including Apple's own ADB peripheral connectors, in favour of the nascent and largely unfamiliar USB standard. From then on, no cow has been too sacred for Apple, sometimes to

the consternation of its customers. Apple did away with the FireWire connector on the original iPod for its own 30-pin dock connector design, then turned around and tossed that out on its ear to be replaced by the smaller, more efficient Lightning port. It was one of the first to remove optical drives from its computers. And, of course, the iPhone 7 banished the headphone jack from the smartphone line.

Apple's taken its fair share of flak for some of those decisions, in particular when it decided to brand its headphone decision as 'courage'. But there is truth to the fact that the company has no fear when it comes to throwing out the past, even if it sometimes feels like the customers are the ones who have ended up under the bus – much as it felt to many when the original iMac was released.

Trendspotting

Perhaps the most significant and lasting effect of the original iMac was that it cemented Apple's place as a trendsetter. Not just in terms of its technical decisions, like embracing USB or trashing the floppy drive, but in terms of the direction that the entire industry was going. Where it went, others followed.

Competitors took notice of Apple's success, even if they missed the mark somewhat. The iMac prompted a rash of imitators, which is to say that companies quickly moved to put out computers with colourful translucent housings, as though the blue plastic alone was what had made the iMac so successful.

The original iMac established Apple as a trendsetter whose influence is still felt today. For example, mobile phone companies like LG are copying the notch found on the iPhone X



And even now, two decades on, we're still seeing that combination of blatant copying and somehow not getting the real point. In the wake of the iPhone X, a number of competing smartphones have showed up on the market bearing a similar 'notch' design to Apple's flagship device, again as though this superficial aspect could be attributed with the device's popularity.

So, as the old saw goes, the more things change, the more things stay the same. Twenty years on, Apple is still embodying the lessons of that original iMac – ones that its competitors have just as resolutely failed to learn.

long-in-the-tooth favourites, and old friends you said goodbye to years ago, can live on and still be useful, thanks to the miraculous digital afterlife known as virtualization.

A legal hedge against obsolescence

When you think about emulation (if you think about it at all), it's probably in the context of downloading software that lets you play old games or even revisit ancient computing platforms, all thanks to software that's probably still under copyright but has often been utterly abandoned.

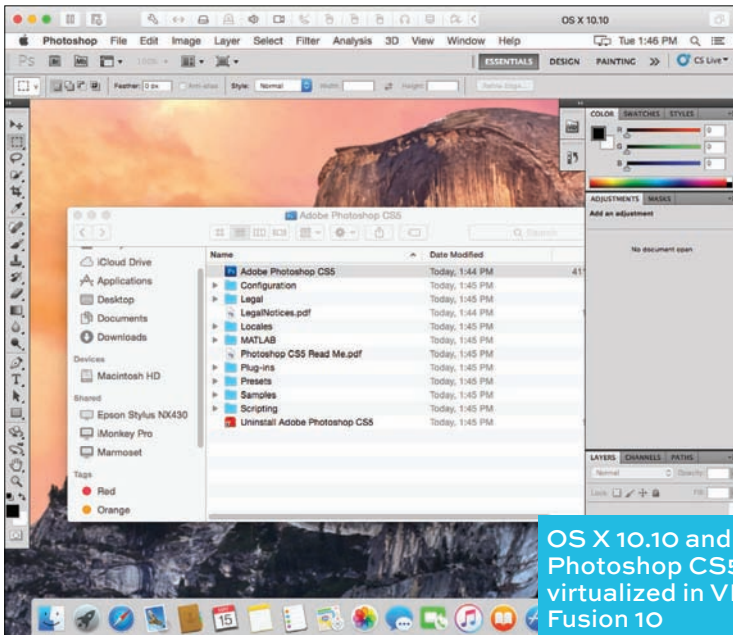
But emulation (and its cousin, virtualization) can also be used legally to do all sorts of useful things. The Linux server I run my entire business on is, in fact, one of many virtualized servers running on a much larger piece of hardware. It's virtual reality for computers: there's an entire pretend computer that's actually a program on a different computer.

If you're a Mac user, you may know virtualization from apps like VMWare Fusion (fave.co/2JneVzi) and Parallels Desktop (fave.co/2kROqrJ), both of which let you run Windows apps while you're also running macOS. Since both macOS and Windows use Intel processors, this isn't emulation (where the software is pretending to be computer's processor itself), but it's still virtualization, since Windows and its apps think they're inside a Windows PC when they're really inside an app running on a Mac.

Running Windows apps can be really convenient if you rely on them. But what about those old Mac apps that are going to be obsolete soon?

And what about those apps you abandoned when you upgraded to Mountain Lion or Mavericks or Yosemite or El Capitan?

It's not widely known, but VMWare Fusion and Parallels Desktop can run virtual versions of macOS, too. There are a few limitations. First off, you can only emulate macOS on hardware running macOS. Second, there are some specific versions of macOS that are allowed for virtualization: Mac OS X 10.5 Leopard and Mac OS X 10.6 Snow Leopard can only have their server versions virtualized, so if you need to dip back that far you'll need to dig up a Mac OS X Server disc or buy an old one on the Internet.



But you're free to virtualize Mac OS X 10.7 Lion, Mac OS X 10.8 Mountain Lion, Mac OS X 10.9 Mavericks, Mac OS X 10.10 Yosemite, Mac OS X 10.11 El Capitan, macOS 10.12 Sierra, and macOS 10.13 High Sierra. (Presumably Apple will continue allowing future versions of macOS to run in virtualization on Mac hardware.)

So if you have old software that you're afraid isn't going to work in a future macOS version, fear not: you should be able to install macOS in VMWare Fusion or Parallels Desktop and keep using that app. You can even set the virtualization software to open in a full-screen space on your Mac, so you can swipe on a trackpad from High Sierra to Mavericks and back. It's not necessarily going to be the fastest or smoothest ride – unless you've got a Mac with a powerful processor and a lot of RAM – but it'll probably get the job done.

What about older software?

I have some serious doubts that anyone is performing major productivity tasks on the classic Mac OS, but there are several options for emulating those old versions. MinixMac is a basic emulator of very old macs, and I was able to get lots of my Mac OS 9 software up and running in the SheepShaver emulator.

(A more likely use case than writing your next novel in WriteNow on System 6.0.8 is that you may want to get data that's locked in a proprietary app out into a format you can manage with modern software. I have a bunch of stuff trapped in old

database files that I was able to access recently for the first time in 15 years.)

There is a big hole, though, if you're someone who, like me, wants to chronicle the history of Mac OS from the beginning up to now: the early days of OS X. Macs in those days ran on PowerPC processors, and it's a real challenge to emulate PowerPC Macs running OS X. I know some people who have done it using the QEMU emulator (fave.co/2Jijj33), but it's hard to get working reliably and it's probably not strictly legal.

Old software, old hardware

However, there's another option: eBay. If you've never shopped for old Mac hardware on eBay, get ready for something. Last week I bought a Power Mac G4 and Apple Cinema Display for £150, and all of a sudden I've got a machine with Mac OS X 10.1 through 10.5 installed on it. (Alas, this system isn't quite old enough to run Mac OS X 10.0 or the Public Beta release.) I'm sure that this area of Mac emulation will one day make more sense, but right now it's in an uncanny valley between the truly ancient and the modern and legitimate virtualization available from Leopard Server forward.

Beyond eBay, of course, consider just keeping your old Macs around after you buy new Macs. Old Macs that seem slow on the current version of macOS will seem much faster when their hard drives are wiped and replaced with an older version of the operating system. My 2009 iMac,

Power Mac G4 and Cinema display

which seemed horrendously slow running El Capitan, absolutely flies when it's running Snow Leopard. If you rely on old software, keeping an old Mac around isn't a bad investment.



Think of the future

The ability to run old software you still need to use is important, but there's a larger issue here, too. In our quest for the latest and greatest, it's easy to discard old technology as outmoded and irrelevant. Which it is, in a way. But after a few years, what was old and outmoded becomes historic, maybe even classic. Internet communities that build emulators of old software and hardware are vital to allowing the people of today and tomorrow to understand what computers and games consoles were like in the early days.

And unfortunately, we can't count on the companies that made these products to be good stewards of their work. Occasionally a company will donate source code to a computer museum,

but often times legal reasons make it impossible for software to be made publicly available. In a perfect world, Apple should've allowed the public complete access to the source code for the Apple II platform, but it hasn't, and probably can't. (Even Apple's donation of the Lisa source code to the Computer History Museum isn't complete; it doesn't have the rights to the included dictionary.)

In this way, I think we have to thank Apple for changing the licence for macOS in 2011 so that it certain versions can be freely virtualized. That probably means that, long after the Mac has vanished and the devices we use no longer use Intel-compatible processors, all the Mac software from this decade will survive in its own virtual reality.

Requiem for Apple's AirPort Base Station

Apple doesn't think this way anymore, writes [Michael Simon](#)



Somewhere in my basement I have an original graphite AirPort Base Station (pictured). It's one of the few non-working Apple products I couldn't bring myself to recycle, and the reason is twofold. One, it's one of the Apple's best designs. In an age where routers were ugly boxes with giant antennas, Apple's curved base station really did look like a UFO. Even after it stopped working, I kept it on my shelf for years.

The other reason is its history. Even more than the iPhone, iMac, iPad, and iPod, the AirPort Base Station is, to me, the greatest example of Steve Jobs' genius. The original AirPort wasn't a product for Apple's power users, it was made for consumers at a time when wireless networking in homes was a foreign concept. It boiled down complicated settings and convoluted configuration screens to just a single plug-and-play system.

As we all know, it wasn't cheap. It only worked with one product, the sweet-coloured iBook. But even without huge sales, the impact the original AirPort had on the industry was immediate and massive, at least as great as the iBook itself.

And now it's dead. And we'll probably never see another product like it from Apple ever again.

Portable wonder

In 1999, the iBook was a risky product for Apple. Designed in concert with Lucent Technologies, it was as revolutionary and bold as the floppy drive-less iMac, and the stakes were just as high. But the addition of AirPort upped the stakes considerably. Steve Jobs envisioned a fully wireless world before the rest of the industry, and the AirPort was the first step to getting there. The iBook didn't need AirPort, but AirPort needed a Mac to get off the ground. And Steve chose the most unlikely of notebooks for its introduction.

An easier path would have been to target pro users who were already familiar with Wi-Fi and ease Apple's less-informed user base into the transition.

Apple iBook

But Steve didn't want it that way. He understood in 1999 that wireless technology was as personal as computers were in 1984, and he wanted to showcase its potential to people.

While the iBook's price was already pretty high at over \$1,599, the Base Station cost around \$299 and the required AirPort card (which installed by lifting up the keyboard) was another \$99, bringing the total price of wireless convenience to just under \$2,000. Steve knew that many or even most iBook customers would probably balk at such a high price, but that didn't concern him. The tracks were laid, as he said himself at the Macworld New York 1999 keynote: "iBook is the first computer ever designed right from the start to be optimized for wireless communication." Obviously, it wouldn't be the last.



A future without wires

It would have been easy to target professional users with AirPort, both from pragmatic and a sales standpoints. But by designing its AirPort to work

with a sweet-coloured laptop rather than its more mature PowerBooks, Steve was telling the world that Wi-Fi was the future, and it needn't be limited to professional users.

Even in 1999, AirPort didn't deliver the 'baby Internet'. It had a top speed of 11Mb/s and more importantly, it embraced privacy with full end-to-end encryption. That was unheard of in a consumer laptop. The clamshell iBook didn't necessarily look the part, but AirPort made it one of the most cutting-edge products in Apple's matrix, and it would take several months for the rest of the Macs to catch up.

Over the years, AirPort evolved into a full wireless solution that worked with any and all devices, but the ease-of-use Apple revolutionized with the original AirPort never went away. From the remarkable Airport Express to the ingenious Time Capsule, Apple's wireless products were always designed with the consumer in mind. It took a complicated system and made it easy, a mantra that Apple has gotten further and further away from as it has grown. I mean, just read the support document Apple provides for choosing a new router.

Short-sighted and simple-minded

It's been a while since the Airport was a must-have device, but that's mostly Apple's fault. Nowadays, you can buy any number of routers or mesh Wi-Fi systems, but none of them beat what the AirPort was. The Orbi satellites I have around my house are excellent, but I still have an AirPort Extreme

Time Capsule hooked up to the one in my office for backups. And whenever I need to dive into the Orbi configuration page to check something, I lament the loss of my AirPort Utility.

Apple could have made a Wi-Fi system that ‘just works’ and combines the all-over coverage of a mesh system with the simplicity of AirPort. But it stopped playing that game long ago. Today’s products are more about filling a category than a need, and I can’t imagine Tim Cook ever giving the green light to something as risky or revolutionary as the AirPort-iBook combo anytime soon. Visit apple.com/wireless now and it takes you to a 404 page. The revolutionary vision that was so strong in 1999 is literally missing.



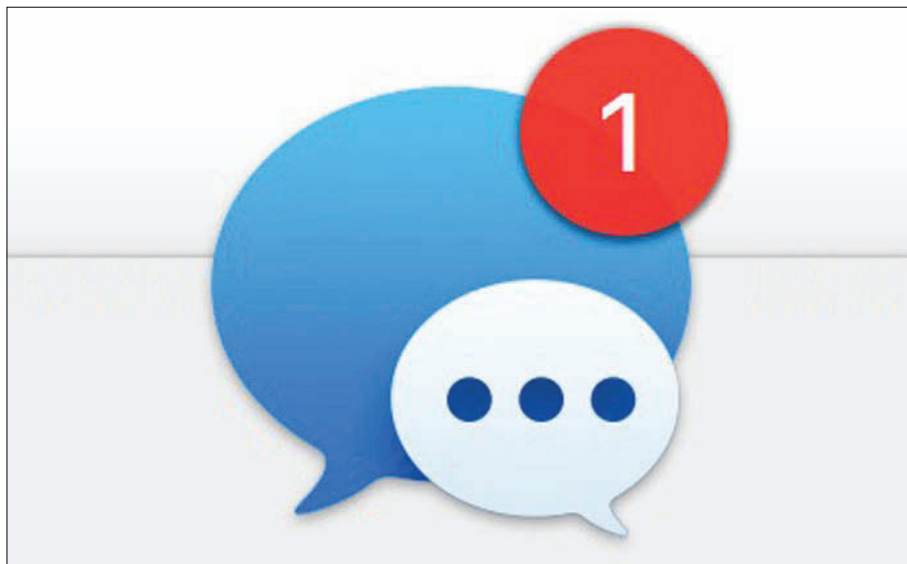
Netgear’s Orbi is a great system, but it doesn’t have the same ease-of-use as AirPort

It's not about the decline of the Mac or the uselessness of the Touch Bar, or even the terribleness of the MacBook Pro's keyboard. It's about a long-term vision that just isn't there anymore. Products like the iPhone X, Apple Watch, and even HomePod are all built to sell now, but where will they be in 10 years? Argue about features and design all you want, but the vision Steve delivered with AirPort just isn't there. iPhone X may represent the start of the next 10 years of iPhone, but Apple's overall vision is decidedly myopic. It's the same reason why it's taken Apple years to deliver on its promise of a new Mac Pro. It's not because it doesn't have the team or the resources, it's because the vision of the existing Mac Pro was so short-sighted, Apple had to scrap the whole things and start from square one.

AirPort wasn't just a foundation to grow on, it was the first step in a decades-long plan that delivered the iPod, iPhone, and iPad, and freed us of wires and tethers. So maybe I'll go dig it out of my storage boxes. Because it might take a while before we see anything quite so visionary from Apple ever again.

Help Desk

Glenn Fleishman answers your most vexing Mac problems



HOW TO GET RID OF A PERSISTENT MACOS MESSAGES BADGE ICON

The badge that can appear on selected apps in the macOS Dock is a helpful reminder that you've got something that requires attention. But when the badge 'sticks' and continues to remain in place even after you've carried out your task? It's a persistent itch you want to scratch.

This can happen in the Messages app, as I discovered recently after texting myself a link when I couldn't get the oh-so-reliable AirDrop to work

between my phone and computer. The link arrived, but the badge wouldn't disappear. Closing the conversation in the list in the left of the Messages window didn't help. Nor did quitting the app.

I tried a suggestion many forum posters around the Apple universe of discussion boards recommended for stuck Dock icons. In the Terminal app, enter exactly the following and press return:

killall Dock

This restarts the Dock, and can clear stuck states. It may take a moment. This, too, failed!

The ultimate solution? I sent another message to myself from my Mac, and then read it on my iPhone. The badge now disappeared in both iOS and macOS.

HOW TO RECOVER A MAIL FOLDER FROM TIME MACHINE IN MACOS

Time Machine in macOS can work within a number of apps, letting you retrieve older versions of files or even deleted email messages in the Mail app. However, if an entire folder of stuff goes away, you need to turn to the Finder. Macworld reader Harold found himself in this pinch, because a folder that contains all his business emails disappeared from Mail without any action on his part that he's aware of. He first tried to use Time Machine within Mail, opening Mail, then choosing Enter Time Machine from the Time Machine system menu item. Every time he did so, Mail quit. If you're using IMAP, a protocol for syncing messages with a remote server

to a local app's mailbox, it's possible to recover it that way, assuming the deletion didn't propagate to the server, too. You should be able to select in Mail: Mailbox > Synchronize > Mail account name, and this will restore access to the messages.

Failing that, however, Time Machine can still do the trick, because it's backing up the mailbox files that Mail uses to store messages locally.

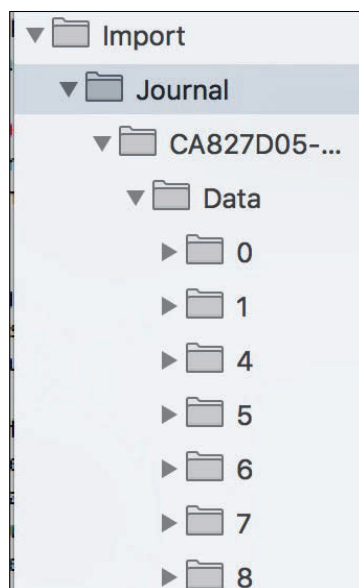
1. In the Finder, choose Enter Time Machine from the Time Machine system menu item.
2. Go to your Home directory, open the Library folder, then the Mail folder inside that.
3. You may see multiple folders

at the next level. Look for the one starting with 'V' that has the most recent modification date and open it.

4. You'll see several folder with long hexadecimal (base 16) names. One of these is the folder that corresponds to the mail account that has the mailbox you need in it. Open each in turn until you find the right one.

5. Restore the file with the name of the missing mailbox, like Small House Design.mbox to the Desktop or somewhere, not to the original location.

6. Exit Time Machine.



An imported mailbox has a nested hierarchy of folders that you can just ignore

7. Switch to Mail, and then choose File > Import Mailboxes.
8. Choose Apple Mail, and click Continue. (Even though the folders end with mbox, they're not using the standard Unix mbox format, which can be used to import mail folders from other platforms.)
9. Select the mbox file in at this stage and then click Choose.
10. All the messages under Items To Import will be selected by default, and that's likely what you want to keep in place.
11. Click Continue.
12. You'll see a dialog that the messages are in a folder and it tells you the name, which is typical 'Import' unless that folder already exists.
13. Look in the Mailboxes view at left under On My Mac, and the Import folder should be at the bottom. Select it.
14. All your messages will appear in the summary column if imported correctly. (If you click open the folders under the mailbox name, you'll see a whole hierarchy you can ignore.)
15. Re-create the mailbox that was deleted.
16. From the Import mailbox, select all the messages and drag them into the mailbox you want them back in. If that mailbox is hosted on an IMAP server, Mail will upload them there.

ONE WAY TO USE AN iPad AS A DISPLAY FOR A HEADLESS MAC

Decades ago, I used to set up 'headless' servers. These were computers that you stuck in a server

room and accessed remotely. While terminal-based remote access for Unix systems was routine, the same approach with GUI-based operating systems, like what was then System 7, was unusual. We had to use a monitor to install Timbuktu Pro, and sometimes even attach a dummy monitor cable afterwards so the Mac ‘thought’ it had a display.

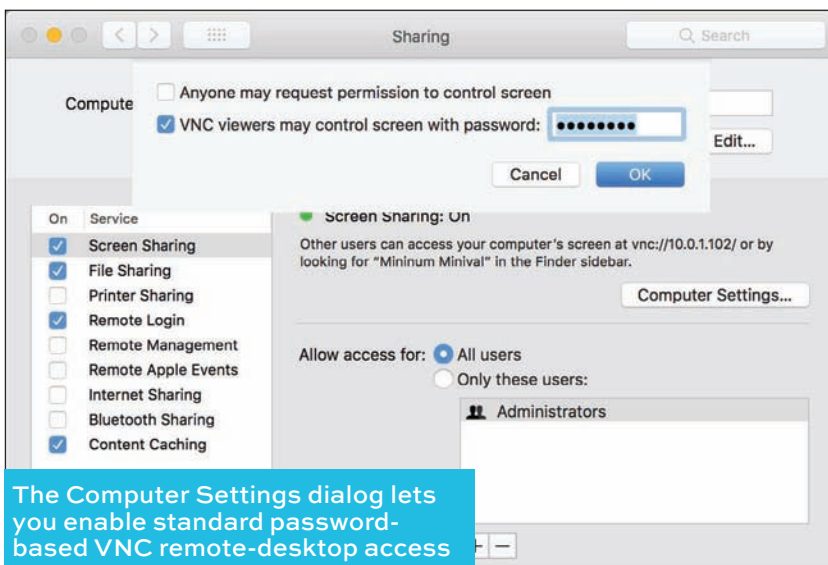
Remote-desktop access later became an absolutely routine part of operating systems, and macOS has offered it as a built-in service for many, many years. Macworld reader Peter asks if there’s a way to examine a Mac mini without a monitor attached, if all he has is an iPad, a keyboard, and a mouse. There is, but you have to set it up with a monitor attached first, as Apple doesn’t enable remote access by default.



Technically, Apple is using a variant of the Virtual Network Computing (VNC) standard for its screen sharing, tying into the macOS user authentication system. iOS doesn't support this, but you can enable a setting that works with third-party apps for remote control.

On the Mac, in System Preference > Sharing > Screen Sharing, you'll see a button labelled Computer Settings. Click this, and note a checkbox labelled 'VNC viewers may control screen with password' and a field to enter a password. Check that box and enter a password, and then click OK.

You can choose to not enter a password, but that makes your computer vulnerable to remote access by anyone. Even if you're behind a gateway that assigns private local addresses or have a



robust firewall, attackers may be able to pierce your gateway or an infected machine on your same network could attempt to gain control of your exposed machine and relay it to someone remotely.

Once enabled, you can use any of a number of third-party VNC apps for iOS. RealVNC's free VNC Viewer is a good place to start: it's free, regularly updated, and well reviewed. When you connect to a Mac via VNC, you see its active desktop, and can type on the keyboard of the device from which you're connecting. However, this doesn't disable local peripherals, so you can instead use a keyboard and mouse attached to the device that's sharing the screen. That way, you could use the iPad as the 'monitor', while typing on the Mac mini keyboard and pointing and clicking with its mouse.

(VNC isn't very secure in Apple's backwards-compatible version, so you should only rely on it for local connections, and you may want to configure your broadband or Wi-Fi gateway to block remote access to the VNC port ranges; check your router manual for details.)

PHOTOS NOT IMPORTING? FIND THE CULPRIT WITH IMAGE CAPTURE

Because my wife's Mac refused to sync her iPhone's media properly, she wouldn't delete photos and videos she'd taken on her iPhone. Eventually, her phone filled up, and it was time to fix this problem.

She recently migrated from iPhoto to Photos – based on Help Desk emails, this isn't a unique

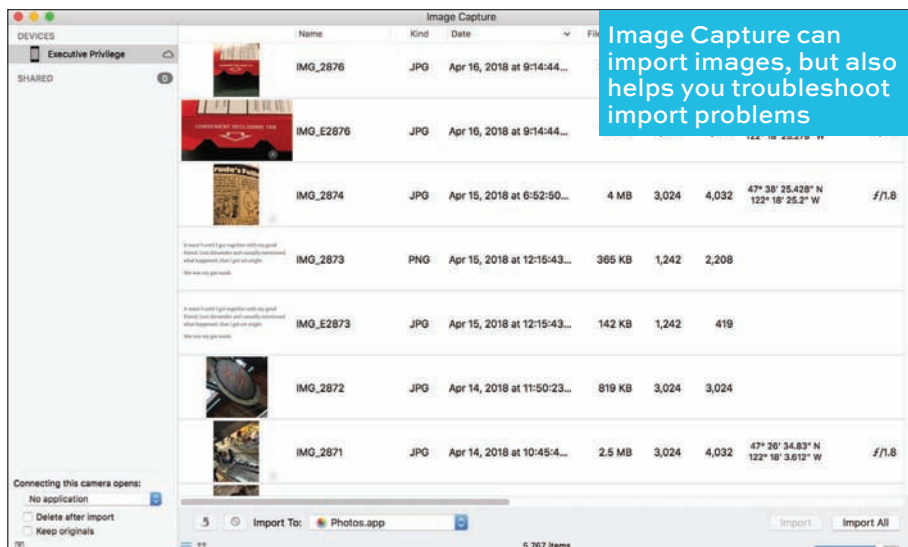
circumstance. Photos seems to be happiest importing relatively few pictures and movies, or using iCloud Photo Library. (She's not interested in storing her personal media in anyone's cloud.)

I recommend using Image Capture. This underappreciated app, installed as part of macOS in the Applications folder, handles importing and managing media on memory cards, scanners, and on attached iOS devices and cameras. (You can also access a scanner via Preview.)

You can set Image Capture via a menu at the bottom of its window with a given device or drive selected to import selected or all media to iPhoto or Photos, as well as to other apps, scripts, or folders.

In my wife's case, however, Image Capture stopped working. She tried to import all images, and it would appear to make progress, but then fail with a lengthy error message listing problematic images, and an incomplete state of what was imported. Image Capture doesn't have an option like Photos for importing only new images (ones that it's sure it imported before), but it also didn't seem like there were rampant duplicates. (To remove Photos duplicates, the best option appears to be PowerPhotos, which can work with Photos libraries directly for deduplication, merging, and other features.)

The list of failed imports was so long, it didn't seem worth the time to try to run each of those down, and she lacked the confidence that her originals were imported correctly besides them that would lead her to delete them from the



phone. (She has an encrypted online backup and regular clones of her drives, to ensure we don't lose her Photos library.)

To figure out what the cause of the problem was, I suggested a different tactic: binary troubleshooting, which is where you split a set of whatever you're working in half, try to accomplish an action and, if it fails, split it in half repeatedly. This lets you drill down to the problem, while also accomplishing the task (like importing media) for sections of the overall set you're working on.

With Image Capture, we attached her phone to her Mac via USB, selected it in the app, and then used the Date field to sort images in chronological order. We then selected the oldest half by finding the rough middle point and selecting from there

backwards in time. Clicking Import, we watched the progress bar – and, shockingly, it succeeded.

We looked at the oldest and newest photos in Image Capture that we'd imported and then cross-checked against Photos to be sure those were imported and at full resolution. With that confirmed, we returned to Image Capture and clicked the delete button and erased that half of the images. That freed up gigabytes. But now, working with the remaining half, we stopped encountering problems in viewing and importing. It's possible that something had become corrupted in iOS in how it had indexed images, and delete half of them either freed up enough space or caused a rebuild operation. Regardless, the errors disappeared.

However, if you find yourself in a similar situation, you could continue down the binary path to identify any remaining images or videos that won't import. You may be able to delete those, either from the iOS device or via Image Capture. If they refuse to be erased, after making sure you've retrieved all the media you can, you might consider backing up the iOS device, wiping it, and restoring it to see if that resets your device's photo storage.

Another option? Switch on iCloud Photo Library, and buy extra iCloud storage if you need it for just the month, syncing everything to a Mac and making sure to download it there at full resolution. Then disable iCloud Photo Library and confirm those images and movies are on the Mac. You can then delete all or some of the media from your iOS device, knowing its safely copied over.

Best budget Mac speakers

Michael Ansaldo's audio upgrades won't break the bank



Your laptop's built-in speakers aren't doing any favours for the gigabytes and gigabytes of music and movies on your hard drive. Even the best ones can leave your audio sounding thin and lifeless. External speakers – along with a good set of headphones – are a must for getting the best fidelity from your media files.

A trip online or to your favourite electronics store will reveal a head-spinning variety of options in this

category, with some systems costing as much or more than you paid for your laptop. You don't need to take out a personal loan to upgrade your audio, though. Quality speakers can be found even with a budget of around £50. And while there is a certain degree of 'you get what you pay for' at this price level, you'll be rewarded with satisfying sound if you're willing to make a few compromises.

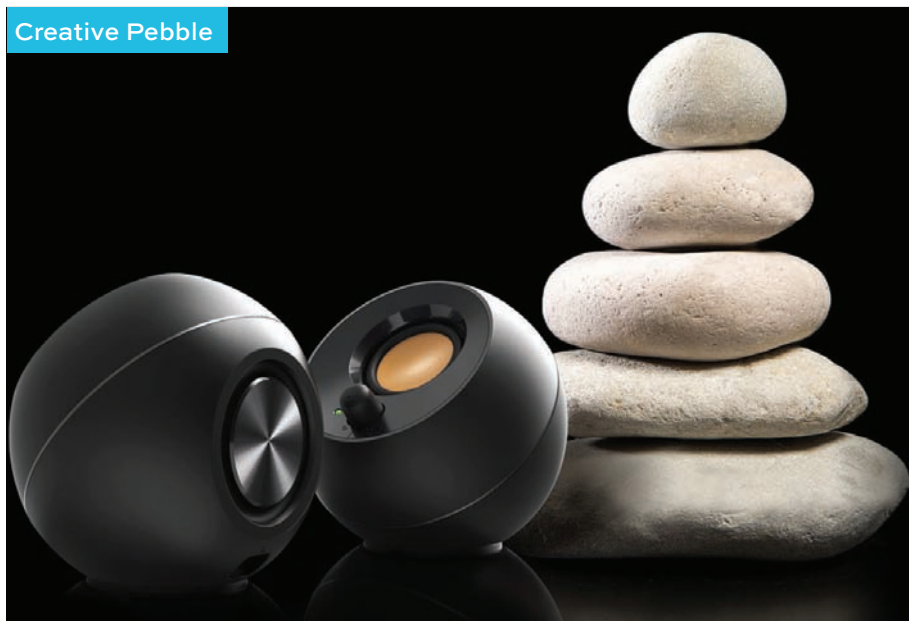
We've given you a head start by testing some of the most commonly available budget models. All cost around £50, sometimes significantly less. We set up each in a typical environment – on a desk in a home office – and play a variety of audio tracks to push their sound capabilities. We also provide some buying advice below to help you choose the right model for your needs.

What to look for

2.0 speakers vs. 2.1 speakers

Sure, a 5.1 (five speakers, one subwoofer) multichannel speaker system sounds sexy. But even if you were to unearth one for £50 or £60, the quality would be just as cheap. That money can buy a much better quality two-speaker system. These basic 2.0 stereo setups, which are comprised of just a left and right speaker with a single driver (the loudspeaker) in each, abound in this price range. Occasionally you can also find a decent 2.1 system – a pair of speakers to handle the higher frequencies and separate subwoofer for the bass. These take up more space but often produce more balanced sound. More on that next.

Creative Pebble

**Audio quality**

Try not to be seduced by manufacturer's specifications on sound quality. Even if you can parse frequency response numbers, they are frequently exaggerated. Let your ears be your guide instead. Listen for a good balance between the high (treble), mid, and low (bass) frequencies. Often, speakers will exaggerate one – usually the treble or the bass – at the expense of the others. Good speakers will produce full, detailed audio that sounds as the creator intended it.

Be aware, though, that finding strong bass response in this price range can be challenging. Without a subwoofer, 2.0 systems have trouble

reproducing low frequencies. The manufacturers often use technological tweaks to beef up the bass notes, but these can sound boomy, and muddy the overall mix. If a deep, controlled bottom end is a priority, a 2.1 system might be a better investment.

AC power versus USB

Both these options are prevalent in the sub-£60 price range. USB-powered speakers reduce cord clutter, as they don't need a separate power cable. However, they can't supply as much juice as the AC variety, so they tend to produce lower volume and less bass.

Creative Inspire T12

Price: £51 from fave.co/2qoMLk

Creative Labs has been synonymous with great-sounding Mac speakers for years, so I expect excellent audio even from the company's lower-end products. The Inspire T12 speaker system did not disappoint, delivering warm stereo sound at a great price compared to other budget Mac speakers we've tested.

Produced in matte-black plastic with a glossy black front panel, the speakers are aesthetically kissing cousins to Creative's higher-end T20 series. Each 180x71x98mm speaker has a tweeter on the front and a woofer that takes up the entire backside. In lieu of a subwoofer, the T12 uses Creative's BassFlex technology to extend the low frequency. Setting the T12 up is easy. The left speaker has

an attached cable that plugs into the right speaker to tie them together. Also on the back of the right speaker is the power port, and an audio input jack you connect to your Mac's headphone port using a supplied 3.5mm cord. On the front is a volume knob that doubles as the power switch, a headphone jack for private listening, and an auxiliary-in jack for lining in your smartphone or other MP3 player.



The T12s have impressive sound for desktop speakers at this price. The high end was crisp without ever getting tinny, and the BassFlex tech gives the bottom end a pleasing punch. The speakers also pack a volume wallop that belies their small size. Cranked all the way, they easily fill a modest-sized room with sound, though the audio tends to muddy at that level, too. I found the halfway point on the volume knob to be the sweet spot for desk-bound listening, delivering satisfying sound whether I was listening to classical, rock, jazz, or hip-hop.

The T12s are also a great audio enhancer for music and movies on your phone or tablet, but

having to physically tether your mobile device to speakers seems archaic. For its part, Creative offers a wireless version of the Inspire T12 that's virtually identical, save for a Bluetooth pairing button where the aux input is on the wired version.

Verdict

If you want to upgrade the audio quality of streamed music and videos on your Mac and are working with a modest budget, the Inspire T12 fit the bill. They won't dazzle you with design like the GOGroove BassPULSE, and they don't integrate the wireless capability like most newer systems do. But if those aren't deal-breakers, they will provide balanced sound with enough bass that brings out the best from most styles of music.

GOGroove BassPULSE

Price: £44 from fave.co/2EDmWob

If the phrase 'Mac speakers' still conjures images of a pair of beige boxes, GOGroove's BassPULSE may be a bit of culture shock. This 2.1 speaker system promises to turn any music listening session into an instant party with a boost to the bottom end and coloured lights that pulse to the beat (choose among the blue we tested, or green or red,).

The BassPULSE system consists of a 279x235x114mm, 10-watt side firing subwoofer and two 209x88x76mm satellite speakers, each with 5 watts of power. The sub is sturdily built and weighs just over 3kg, while the satellites are slim sheets

of sculpted acrylic, each with a Neodymium Full-Range driver embedded at the top and angled to target your earholes when you're sitting at a desk. All three pieces have built-in LEDs that glow blue, red, or green depending on which model you buy.

The two speakers share a single cord that plugs into the output jack in the back of the subwoofer. An included 3.5mm cord plugs into the adjacent input jack. The other end plugging into the auxiliary output or headphone jack on your Mac or mobile device, or you may connect the system via Bluetooth if you prefer to be untethered. The power cord is attached to the back of the subwoofer, so you don't need to worry about misplacing it.

Once the sub is plugged into an AC outlet, all you have to do is flip on the power switch. Everything is controlled from a panel on the front of the sub. A pair of knobs control the volume and bass level, respectively. Beneath these is a 'pulse' button that activates the LEDs. These glow steadily until you crank the bass past 80 percent of maximum, then they'll pulse with the music.

Given the big subwoofer – and the name of the system itself – it wasn't surprising that the bass stole the show in my



testing. However, it tended to bleed into other frequencies. Dialling down the bass knob added a little more clarity, but the bass had more or less the same boom quality whether I was playing rock, jazz, or EDM. The mids and highs were more distinct, and the sound never distorted even with all knobs cranked to the limit.

The pulsing lights, however, were a major disappointment. Maybe I was expecting too much, thinking they would operate more like a dance floor strobe, but even with the bass cranked they produced nothing more than a blink-and-you'll-miss-it flicker. Frankly, they work better as a light by which to navigate the speaker controls in a darkened room than an ambience-enhancer.

Verdict

The BassPULSE may over-promise on its light show capabilities, but it's a good speaker system for the price. Most users will notice a definite improvement over their Mac's built-in speakers, with enough power to fill a small room whether you're listening to music, gaming, or watching a movie.

Logitech Z150 Stereo Speakers

Price: £22 from fave.co/2GUneSg

Logitech's Z150 stereo speakers cater to those with simple needs. No flamboyant designs or crazy amounts of connectivity options for these users. It's enough to find a pair that brings a little extra volume and clarity to our computer audio and fits

on our desk. Even within our budget Mac speaker round-up, this pair is notably inexpensive and unassuming.

As you'd expect with entry-level speakers, the Z150 set is small, lightweight, and slim on features. The enclosures measure 151.5x84.5mm, and each are constructed with matte-black plastic, weighing 550g. The 2in speaker drivers are uncovered on the front panel, and the control unit has a power/volume knob, a headphone jack, and input for other devices like your phone or tablet. A cutaway at the bottom of each speaker seems to be for aesthetic purposes rather than any sound enhancement.

The speakers require minimal setup. They're hardwired together, so you just need to plug the detachable power cord into an outlet and the 3.5mm cable attached to the back of the control unit into your Mac. With 6 watts of peak power, these speakers can get plenty loud. I kept the volume knob at the halfway point (my Mac volume was set to max) during desk-bound listening.

The sound quality is better than you'd expect at this price point: the stereo separation is excellent and the mids and highs are clear and full. However,



with no subwoofer or other bottom-end support, the bass is clear but has no depth and could easily get overpowered by the rest of the track. At higher volumes, the highs started to suffer a little, too, with cymbals getting harsh and some sibilance creeping into the vocals.

One quirk of the Z150 is that although it includes a jack for headphones, it offers no amplification for them. If you plug in for some private listening, you'll quickly notice that the speaker's volume knob has no effect. Instead, you have to adjust the volume in your system settings. This is a common complaint about the speakers in online user reviews.

Verdict

The Z150 will bring clear sound and nice volume boost to music and movies played on your Mac or mobile device. If your expectations – and your budget – are modest, and the lack of bass response isn't a deal-breaker, they are a decent upgrade for the cost. But if you can squeeze another £5 or £10 out of your bank account, slightly more expensive models in our buying guide that will give you much more bass for the buck.

Runner-up:

Edifier R19U Multimedia Speaker

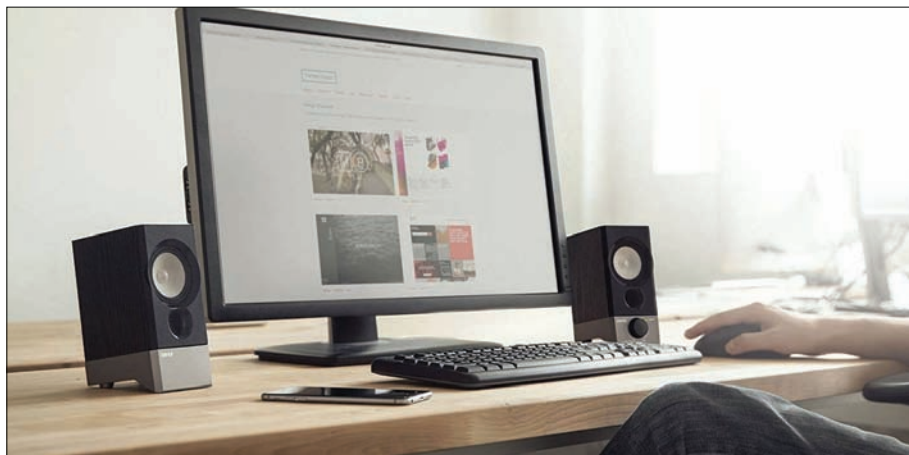
Price: £37 from fave.co/2qo2Hjo

Typically, the lower you go under the £50 threshold for budget Mac speakers, the more the returns diminish. Edifier's RU19 2.0 system is a rare

exception. These speakers sound great, look great, and at just £37 they leave your bank balance largely unscathed. It's one of the better buys here, which is saying a lot when they are all so affordable.

The R19U will bring a little style to your desktop. Each 105x85x175mm speaker has a matte-silver base with a black faux-wood enclosure that gives it a warm vintage vibe. Its 2.75in driver and porthole is covered with black mesh grill. They are controlled by a large black power/volume knob on the left channel, which also has a 3.5mm headphone port. On the back is a 3.5mm AUX socket, where you can connect your mobile device or other audio player with the supplied cord.

To set up the R19U, you first plug the RCA connector extending from the left speaker into the jack on the right one. Next, plug the USB cable into your computer. As the speakers draw the audio as well as the power from this USB connection, you'll



then need to access your operating system's audio settings and change the output to the R19U.

The speakers deliver excellent, balanced sound, with rich mids and crisp highs. Even without a subwoofer, they have a good controlled bass response. It won't rattle your windows, but it has a satisfying punch.

As is common with USB speakers, the volume output is a little low. Even with the source volume maxed, I had to push the speakers' volume knob past the halfway point to get to a listenable level when I was sitting in front of them. When I wanted to listen to music while moving about the room, I'd have to turn them up all the way. The good news is that they didn't distort even at the highest volume.

Verdict

Put the Edifier RU19 on the shortlist of sub-£50 speakers worth buying. They brought the best out of any given audio, whether it was an album, a film, or a YouTube video. And the subtle design nod to the wood floor standing speakers of home audio's golden age was endearing. If you can live with the bass and volume limitations inherent in USB-powered speakers, you won't be disappointed.

Best overall budget speakers:

Creative Pebble

Price: £40 from fave.co/2qntVWR

Creative says its Pebble speaker set was inspired by a Zen Japanese rock garden. This USB-powered

2.0 system has a simple, sparse design with a subtle aesthetic appeal. Still, I wondered how much audio enhancement they could bring to a Mac for a measly £40. It turns out, quite a bit, even compared to pricier budget Mac speakers we've tested.



Available in black or white (the price for white may differ slightly on Amazon, each speaker measures 114x13x116mm – about the size of a grapefruit. The space-saving size makes it easy to find room for them on even the smallest or most cluttered desk. The rubber ring on the flattened bottom of each enclosure keeps it from slipping on your desktop.

Pebble's 2in far-field drivers – which combine for an RMS of 4.4 watts – are angled at 45 degrees. This design is optimal for directing the audio at your ears when you're sitting in front of your computer. Built-in passive radiators extend the low-frequency response for beefier bass. A power/volume knob on the front panel of the right speaker works in conjunction with your Mac's audio controls to manage Pebble's volume.

With Bluetooth speakers becoming more the norm, contending with cables can feel like a hassle.

Fortunately, Pebble keeps the wires few and tidy. The two speakers are hardwired together, so all you need to do is plug the USB cord into one of your Mac's ports, and the 3.5mm input into your headphone jack. Each of these cables is attached to the back of the right speaker, so you don't need to worry about losing them.

Pebble delivers surprisingly rich, immersive audio. USB-powered 2.0 speakers tend to suffer in sound quality compared to their AC-powered counterparts, but that wasn't the case here. Highs were crisp and clear, and the bass had plenty of presence. Overall, the audio had depth and detail no matter what type of music I ran through the speakers. The tipping point for speakers this size is usually at higher volumes, where distortion becomes an issue. But even when playing bottom-heavy genres like dub or dance music, Pebble retained crystal clarity at high volume.

Verdict

Decent sound in £40 stereo speakers is as rare as gold. Pebble sets a new bar with its well-above-average audio. It's not audiophile quality – nothing at this price point is – but it's fuller and more balanced than you find in Mac speakers that cost twice as much. Pebble offers an inexpensive audio upgrade that's tough to resist.

Latest Mac games

Andrew Hayward looks at this month's best new releases



On the hunt for something new to play? If you have a pretty capable Mac, then you have a lot of options right now. May delivered a nice stack of new games worth checking out. Role-playing epics like *Pillars of Eternity II: Deadfire* and *The Elder Scrolls Online's* Summerset expansion are the two biggest examples, but this month's list also includes some offbeat or atypical picks like *House Flipper*, *Monster Prom*, and *Quarantine Circular*.



1. Pillars of Eternity II: Deadfire

Price: £32.99 from Steam (fave.co/2sCmigr)

Obsidian's original Pillars of Eternity was an excellent throwback to Baldur's Gate-style isometric role-players, and now the long-awaited Pillars of Eternity II: Deadfire is here to continue its tale. Here, we see the fantasy crew battling through an archipelago, sailing in swashbuckling fashion, and pursuing a god all the while. The central story is excellent, with a strong continuation of its predecessor's themes. The problem is there's not much outside that central story. Pillars of Eternity II feels like a game built off the backs of four or five major 'set piece' moments, jaw-dropping story beats with the sort of spectacle I didn't think was possible in an Infinity Engine-style game.



2. House Flipper

Price: £15.49 from Steam (fave.co/2syURUK)

House Flipper is like a playable version of one of those cable TV shows about buying crummy houses and turning them into resell-ready stunners, but in this case you're the person in charge of cleaning up messes, tearing down walls, fixing electrical issues, and plenty more.

It's a first-person game that lets you do all the hard work yourself, from interior design to construction, and you'll even have to manage your budget like real-life flippers. It's an earnest simulation, but the atypical game concept has boosted sales and made it a favourite for Twitch streamers and YouTubers to share their antics. Who knew house repairs could be so much fun?



3. The Elder Scrolls Online: Summerset

Price: £19.99 from Steam (fave.co/2xNtafV)

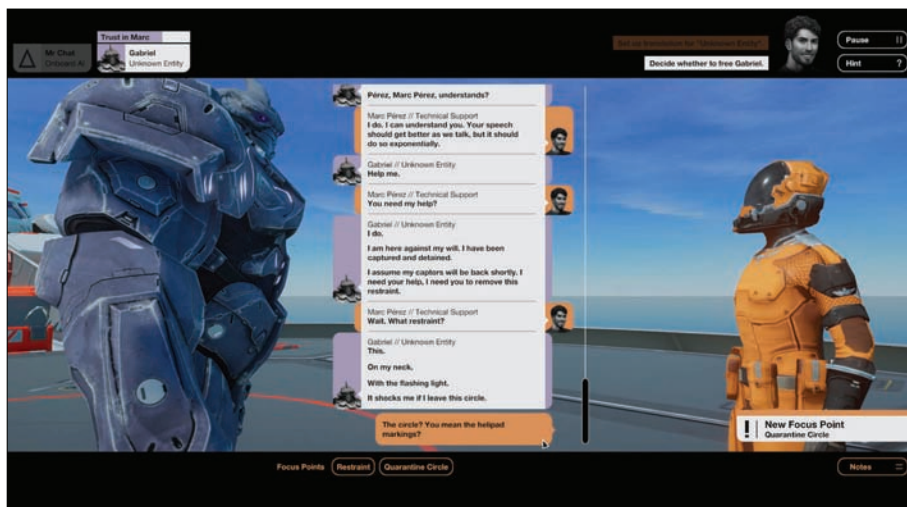
If *The Elder Scrolls Online* is your game of choice, then you'll probably be over the moon to see this month's release of the Summerset expansion pack. It doesn't have the same buzz as last year's *Morrowind* add-on, given the popularity of the previous *Elder Scrolls* adventure that environment was pulled from, but Summerset still has plenty to offer. It has a compelling new chunk of content, including stories and characters we cared about, along with access to the titular home of the High Elves. You can buy the expansion alone on Steam if you already play *ESO*, but the Digital Collector's Edition opens the base game of *The Elder Scrolls Online* to you as well if you're a new player.



4. Moonlighter

Price: £15.49 from Steam (fave.co/2kSarqn)

Now here's an intriguing combination: Moonlighter is one part Legend of Zelda-inspired dungeon battler, and one part banal retail simulator. As Will, the son of shopkeepers, you'll spend your day setting prices, interacting with customers, managing staff, and upgrading the store along the way. But at night, the game is very different. See, Will moonlights as something of a warrior, diving into mysterious dungeons to fight creatures and recover loot, which he'll then sell at his shop. The two sides of the game feed into each other, and early reviews have been very positive, citing a Stardew Valley-like hook to the daytime routine along with challenging combat in the evenings.



5. Quarantine Circular

Price: £4.79 from Steam (fave.co/2JkpoNM)

Many games try to wear extensive content as a badge of honour and boast of ample replay value to entice buyers, but last year's acclaimed *Subsurface Circular* went in the opposite direction. It was billed as a 'one-sitting game', a compact and concise narrative adventure about a robot detective chatting up others of his kind to unravel a mystery while aboard a subway train. And now *Quarantine Circular* does much the same with a self-contained story. It's not a sequel, even if the dialogue-centric approach is similar: it's about a group of scientists engaging an alien found amidst a global pandemic, and the results of your dialogue could shape the future (or demise) of humanity. Choose wisely.



6. Wizard of Legend

Price: £12.39 from Steam (fave.co/2sB6N8m)

Moonlighter only goes part-time on the dungeon-crawling beat, but Wizard of Legend is all-in on chaotic monster brawling. We've seen a number of retro-stylized 'rouge-like' games with pixel graphics and challenging combat, but what sets Wizard of Legend apart is the frantic pace of its action, and the focus on magic spells rather than physical weapons. You'll dart around the environment whipping out dozens of different spells and abilities, all of which you'll need to harness to stay alive and keep pushing ahead. And you can also invite a local pal for co-operative or competitive action, which leads to a chaotic whirl of explosive attacks on the screen. User reviews so far have been positive.



7. Monster Prom

Price: £9.29 from Steam (fave.co/2JiEodH)

Dating simulations can be pretty weird at times and *Monster Prom* definitely fits that criteria. Why? Well, aside from starring monsters, it's also a competitive local multiplayer experience. It's three weeks before prom and you (again, a monster) don't have a date. What to do? Well, this narrative-driven game leads you through various choices as you try to secure a companion for the big event, and it looks hilarious, risqué, and certainly offbeat. And if you have pals alongside, you can even battle it out for the affections of your freaky classmates.



8. Total War Saga: Thrones of Britannia

Price: £29.99 from Steam (fave.co/2sB8AKC)

Creative Assembly's Total War franchise usually delivers massive, historical strategy epics, but Total War Saga: Thrones of Britannia tries a different tact. It's a smaller, streamlined take on the series, keeping the core thrust of the franchise while honing in on a more compact tale and trimming off some of the series' craft.

Thrones of Britannia begins in 878 AD, as various forces (including Anglo-Saxons and Viking settlers) attempt to control Britain and help define its path into the future. Reactions to the game have been predictably wide-ranging: critical reviews are pretty good overall, while a lot of Steam users are upset about the changes. Your experience may vary.



9. Horizon Chase Turbo

Price: £15.49 from Steam (fave.co/2szcXG3)

The original Horizon Chase is one of our favourite iOS racing games, and now the retro-inspired racer is available on Mac with Horizon Chase Turbo. Like the smaller-screened edition, Turbo pays tribute to old gems like Out Run and Top Gear, keeping things simple as you focus on jetting past the competition and securing victory. Horizon Chase Turbo benefits from spruced-up graphics, even if the bright, angular look remains intact, plus it adds four-player split-screen support across all modes. It's packed with content, too, given the 109 tracks spread across 48 cities, along with 31 cars. And while it doesn't have live online play, you can battle for pole position on the leader boards with rivals.



10. Framed Collection

Price: £7.19 from Steam (fave.co/2xNKy47)

Framed is one of the most uniquely compelling games on iOS, and Framed 2 is essentially more of the same, not that we're complaining. And now you can play both of these games on Mac with the 2-for-1 Framed Collection. If you haven't played either game on iOS, here's the gist: it's a mystery game that plays out in the form of an interactive comic book. Essentially, you'll advance the tale by rearranging comic panels in real time, ensuring that the events unfold in a way that helps your character progress or survive. It's part puzzle solving and part trial-and-error tinkering, and the end result is highly engaging. Framed played perfectly with touch controls, but a mouse pointer should be sufficient.

